HVM Utility Software for the HVM100 Human Vibration Meter

User Manual

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IHVMU.01 Rev. A

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CHAPTER

1 Introduction

Larson Davis HVM Utility Software works in conjunction with the Larson Davis HVM100 Human Vibration Meter.

This is a companion manual to the Model HVM100 User Manual (IHVM100.01) which not only provides step-by-step instruction for the manual operation of the instrument but also detailed explanations of the terminology and measurement functions associated with the three modes of operation offered; Vibration (standard), Hand-Arm (optional) and Whole Body (optional).

Overview

The HVM100

The HVM100 is a powerful but small vibration measurement tool. Used as a stand-alone instrument, this handheld vibration analyzer will perform measurement functions appropriate to a variety of applications including; Whole Body Vibration analysis, Hand-Arm Vibration analysis, and general purpose vibration analysis. It features three input channels, a sum channel, a variety of frequency weighting and band limiting settings, single and double integration, displayed data in a variety of units, and independent AC or DC outputs for all three channels simultaneously.

EU Physical Agents Directive

Directive 2002/44/EC of the European Parliament and of the Council, on the minimum health and safety requirements regarding the exposure of workers to the risk arising from physical agents (vibration) sets limits on worker's hand/arm and whole-body vibration exposure and promotes vibration reduction at the source.

Article 4 of this Directive specifies that "the employer shall assess and, if necessary, measure the levels of mechanical vibration to which workers are exposed". It also specifies that this data "shall be preserved in a suitable form so as to permit consultation at a later stage".

In order to avoid or reduce exposure, it is stated that "the employer shall establish and implement a programme of technical and/or organisational measures intended to reduce to a minimum exposure to mechanical vibrations and the attendant risks".

The Software

In order to meet the provisions of the Physical Agents Directive, employers need to create a database which includes the vibration characteristics (hand-arm and/or whole-body) for the tools generally used by their employees for a variety of different tasks, since their vibration characteristics may vary from one application to another. Further, they need to be able to use this data base to estimate the daily exposure of a worker using different tools under varying circumstances during the day.

In order to assist employers in evaluating exposure of their workers to hand-arm and/or whole-body vibration, manufacturers of vibrating equipment need to be able to supply data for their products which will permit users to make engineering trade-offs between, for example, using a very efficient tool having heavy workload generating a very high vibration and another less effective tool which would provide a lower vibration level but require a longer exposure to complete the same task.

Data Base

Note that the HVM Utility Software cannot be used to create measurement setups for use by the HVM100. This functionality is provided by the Larson Davis Blaze® software for the HVM100, which can also automate the operation of the HVM100 when performing measurements.

The HVM Utility Software permits both users and manufacturers of vibrating equipment to create PC-based vibration data bases containing data measured using an HVM100 Human Vibration Meter. Separate data bases are used to hand-arm and whole-body vibration.

Daily Vibration Exposure

Daily vibration exposure for a worker using multiple tools for varying activities can be generated in a single report format by selecting specific data base record for each of the tools and the specific activity to be performed.

Product Test Data Sheet

Data from multiple referenced download data can be combined into a single sheet. The HVM Utility software uses the extension .vdb for hand/arm database files and the extension .wdb for whole body vibration. Data from these sheets can be exported directly to Microsoft Excel™ in .csv file format.

Organization of the Manual

We invite you to read this manual to optimize the benefits to be gained from this powerful software package.

This manual has six chapters covering the following the topics:

Chapter 1 - Introduction

This chapter begins with a brief overview of the features of the IHVM100 and HVM Utility Software. This is followed by a description of the structure of the manual to assist you in finding the information you need.

Chapter 2 - Getting Started

This chapter will assist you in the preliminary steps in getting online with your system:

- Installing the software
- Starting the program
- Selecting the activity to be performed: Downloading data, working with hand/arm vibration data or working with whole body vibration data.

Chapter 3- Download Data

This chapter describes the process of downloading data which has already been measured and stored in the HVM100 to the PC.

- Establishing communication between the computer and the instrument.
- Downloading of data from the IHVM100 to the PC

Chapter 4 - Hand/Arm Data Mode

In this chapter we describe how to work with hand/arm vibration measurements.

- Working with *.hvm hand/arm data measurement files
- Working with hand/arm databases
- Viewing and averaging hand/arm vibration measurements
- Graphic presentations of hand/arm vibration data
- Calculation of daily hand/arm vibration exposure

Chapter 5 - Whole Body Data Mode

In this chapter we describe how to work with whole body vibration measurements.

- Working with *.hvm whole body data measurement files

- Working with whole body databases
- Viewing whole body vibration measurements
- Graphic presentations of whole body vibration data
- Calculation of daily whole body vibration exposure

Chapter 6 - Product Test Data Sheets

This chapter describes the creation of product test data sheets for both hand/arm and whole body vibration. using the databases created in the previous chapters. These product test data sheets permit the automatic printout of referenced database information without the need to pass through an exposure calculation.

Chapter 7 - Help/Tools

This chapter presents a number of text files as assist in the utilization of the various modules in the HVM100 Utility software.

Formatting Conventions

This manual uses the following formatting conventions:

In step-by-step directions, the process (what you do) is shown in the right column, and the rationale (why you do it) with other cautions and comments shown in the left column. Especially important information is shown in italics.

Special Features of the Electronic Version

There are a variety of special techniques for navigating through pdf documents which can greatly simplify finding specific items in this manual. Three of these, bookmarks, links and cross references are discussed below.

Bookmarks

Opening Bookmarks

Bookmarks are clickable navigation tools in pdf files. To open a bookmark, left click the upper tab on the left of the screen labeled **Bookmarks.** These will appear as shown in FIGURE 1-1.

FIGURE 1-1 Bookmarks

In the unexpanded view, bookmarks lists the names and page numbers of chapters and appendixes in order of appearance, as well as the Table of Contents and the Index.

Closing Bookmarks

To close bookmarks, simply left click the tab once more.

Expanding Bookmarks

For any entry, if there is a + within the rectangle to the left, there are sub-entries which can be displayed upon expanding the tree by clicking the rectangle. For example, clicking the + to the left of any chapter will expand it into major headings and by clicking all the + symbols, the complete tree for that chapter will be shown. In Figure 1-2 we can see the entry Introduction

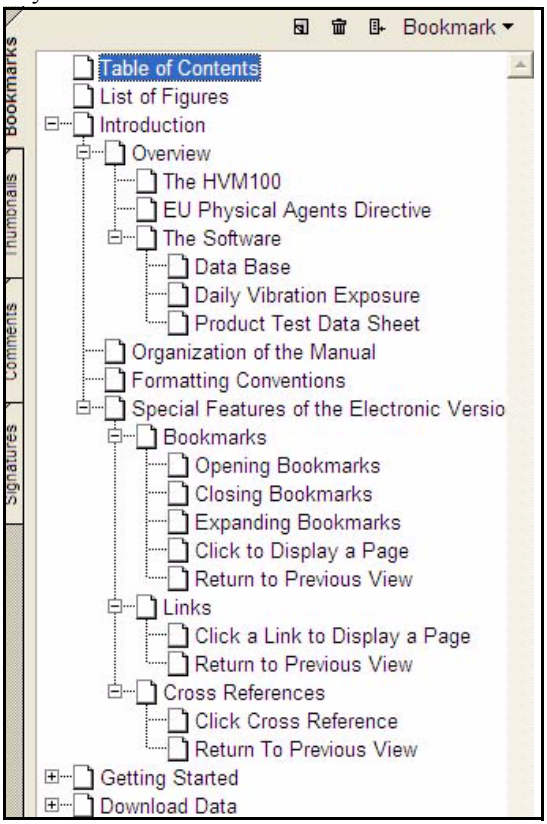


FIGURE 1-2 Bookmarks Expanded

Click to Display a Page

Left click on any text field (Chapter name, Appendix name, Table of Contents, Index, or any sub heading) and the page displayed on the right will jump to the page associated with that text field.

Return to Previous View

There are several methods to return to a previous view. These methods differ in the various version of Adobe Reader. Refer to Help in your version of Adobe Reader.

To return to the page which was displayed previous to clicking on a bookmark text line, click the “View Menu” in the menu bar. Click the “Goto” and then “Previous View” on the pop up menus.

Links

Click a Link to Display a Page

The Table of Contents and the Index have a page number associated with each item. For the Table of Contents, left click on the text line and that page will be displayed. For the Index, left click on the page number itself to display the page associated with that entry.

Return to Previous View

To return to the page which was displayed previous to clicking on an item in the Table of Contents or a page number in the Index, click the “View Menu” in the menu bar. Click the “Go to” and then “Previous View” on the pop up menus.

Cross References

Click Cross Reference

Throughout this manual there are cross reference links to other chapters and figures. The cross reference may appear similar to: FIGURE 3-5 “Measurement Properties Screen” page 3-3. Left click on these text areas to display the page associated with that cross reference.

Return To Previous View

To return to the previously displayed page, right click on the page to open a pop up menu and left click “Go to Previous View” on the pop up menus.

CHAPTER

2 Getting Started

Installing the HVM Utility Software

Note: Do not insert the hardkey activation dongle until the software and drivers have been installed.

When you insert the HVM Utility CD, it will automatically bring up a CD browser screen. Follow the on-screen instructions to install the software.

After the software and Dongle Device Drives have been installed, insert the USB Activation Dongle and restart your PC.

No Dongle Message

If the dongle is not connected, the warning message and Demo Mode Action Box will appear as shown below.

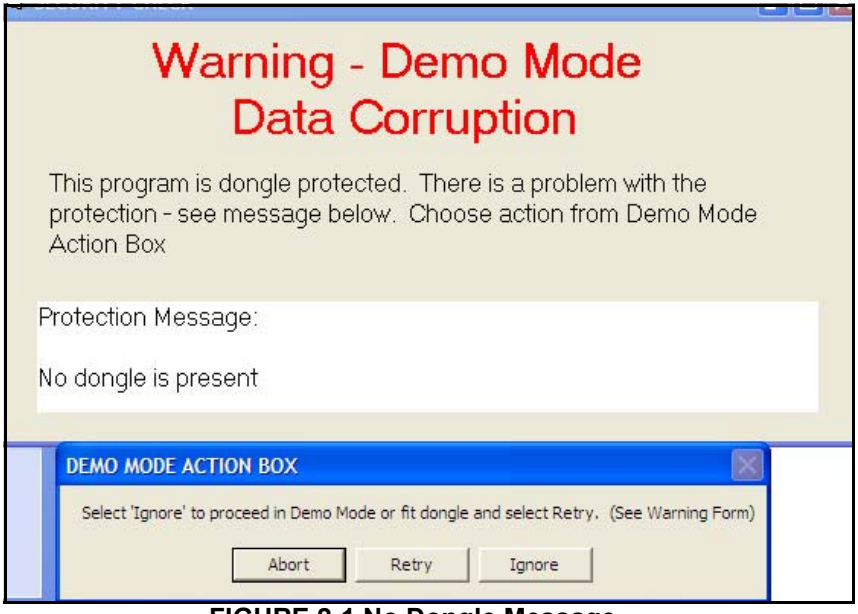


FIGURE 2-1 No Dongle Message

Demo Mode

The program can be run in a demo mode, in which case it will not download data from an HVM100. To do this, left click I**gnore**.

Otherwise either left click **Retry** to see if the dongle will be found, or left click **Abort** to stop the program.

Dongle Diagnostics

If a message appears indicating that the system cannot find the dongle, run the install program to obtain the display shown below.

FIGURE 2-2 HVM Utility Installer

Left click **License Manager** to open the display shown below.

FIGURE 2-3 License Manager

Left click **View License Key**. to obtain the display shown below.

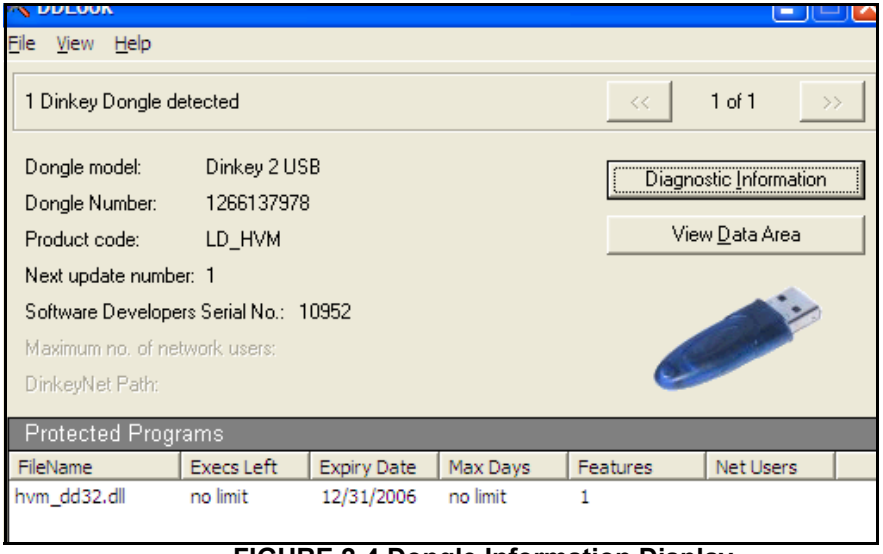


FIGURE 2-4 Dongle Information Display

Connecting to the HVM100

Cable

The computer communicates with the HVM100 via the serial port using a CBL006 serial interface cable. Connect the cable between the Serial Port on the top of the HVM100 and one of the Com Ports on the computer.

Baud Rate

To set the baud rate of the HVM100, press the **Tools** key as shown in Figure 2-5

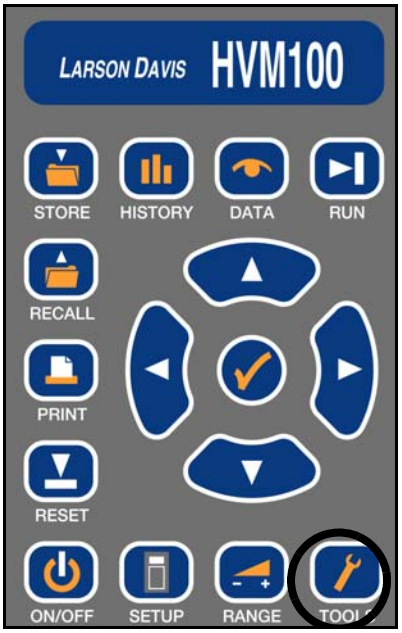


FIGURE 2-5 Tools Key

Press the down arrow key until the Baud Rate screen is displayed, as shown in Figure 2-6.

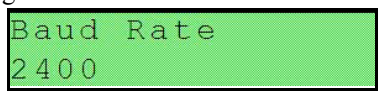


FIGURE 2-6 Baud Rate

We want the baud rate to be 115.2k. If this is not the value indicated in the display, press the check key

which will cause the display to blink. Press the right arrow key until the Baud Rate display indicates 115.2k.

Starting the HVM100 Utility Software

Double click the startup icon for the HVM Utility Software to start the software running. This will bring up the Opening Screen as shown in Figure 2-7.

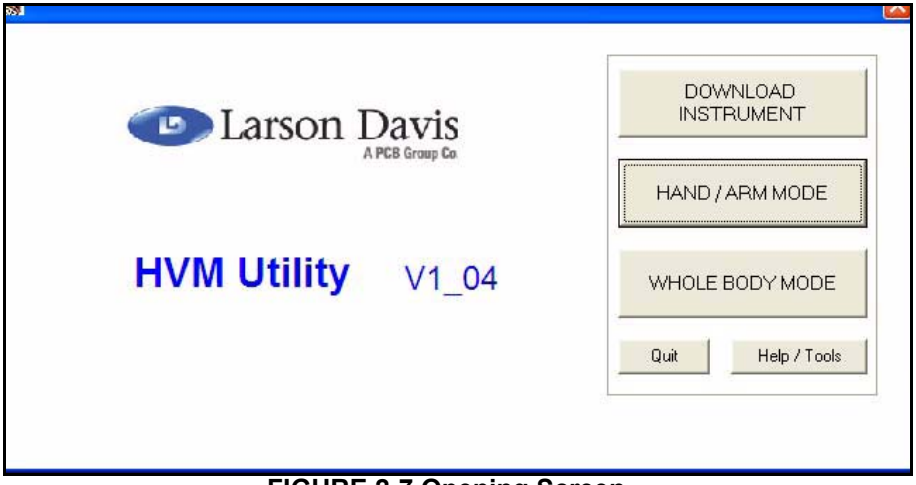


FIGURE 2-7 Opening Screen

Selection of Activity

There are three activities which can be performed using the HVM Utility software.

Note that the HVM Utility Software cannot be used to create measurement setups for use by the HVM100. This functionality is provided by the Larson Davis Blaze® software for the HVM100, which can also automate the operation of the HVM100 when performing measurements.

•**Download Instrument:** Download data previously measured and saved in the HVM100 memory to the PC. See Chapter 3 "Download Data" on page 3-1 for a detailed description of this activity.

•**Work with Hand/Arm Vibration Data:** Create data bases, select records, view data, calculate exposure and create product test data sheets for hand/arm vibration data. See Chapter 4 "Hand/Arm Mode" on page 4-1 for a detailed description of this activity.

•**Work with Whole Body Vibration Data:** Create data bases, select records, view data, calculate exposure and create product test data sheets for whole-body vibration data. See Chapter 5 "Whole Body Mode" on page 5-1 for a detailed description of this activity.

Left click the box listing the name of the activity you wish to perform and proceed to the appropriate chapter of this manual as listed above.

CHAPTER

3 Download Data

To work with data previously saved, go directly to the appropriate chapter, Chapter 4 "Hand/Arm Mode" on page 4-1 or Chapter 5 "Whole Body Mode" on page 5-1.

This chapter presents a description of the procedure for downloading data which has already been measured and stored in the HVM100 to a PC.

Initiating a Connection

To initiate a connection between the HVM100 and the PC, left click the DOWNLOAD INSTRUMENT box in the Opening Screen as shown in Figure 3-1.

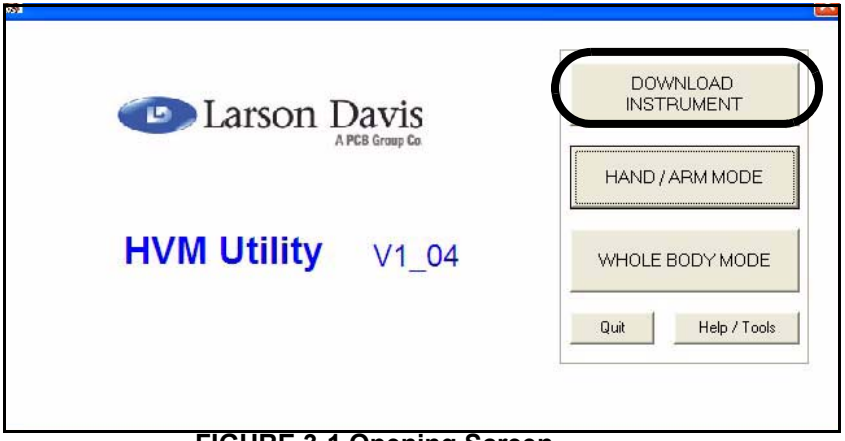


FIGURE 3-1 Opening Screen

This will open the Connection Screen, shown in Figure 3-2..

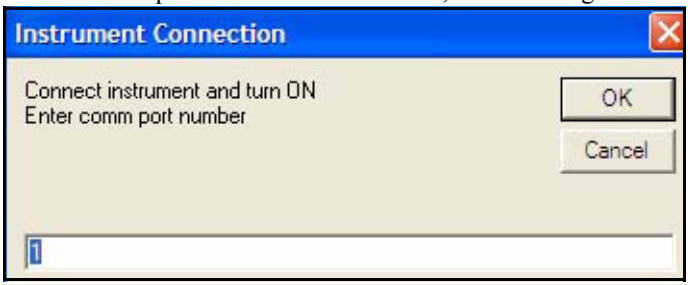


FIGURE 3-2 Connection Screen

If the HVM100 is not already turned on, switch it on by pressing the **On/Off** key as shown in Figure 3-3.

FIGURE 3-3 On/Off Key

Use the keypad to enter the number of the computer Com Port to which the HVM cable is connected and left click **OK** to implement the connection.

Downloading Data

When the connection has been completed, the download of data will begin. The progress of the download will be indicated by the horizontal bar at the bottom of the Connection Screen, as shown in Figure 3-4.

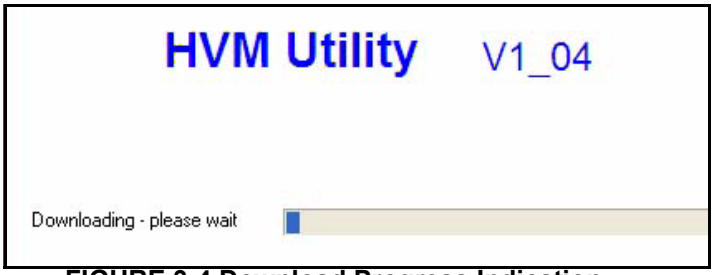


FIGURE 3-4 Download Progress Indication

When the download process has been completed, the window shown in Figure 3-5 will appear to permit the assignment of a name to the downloaded record and to save it to a designated folder in the PC.

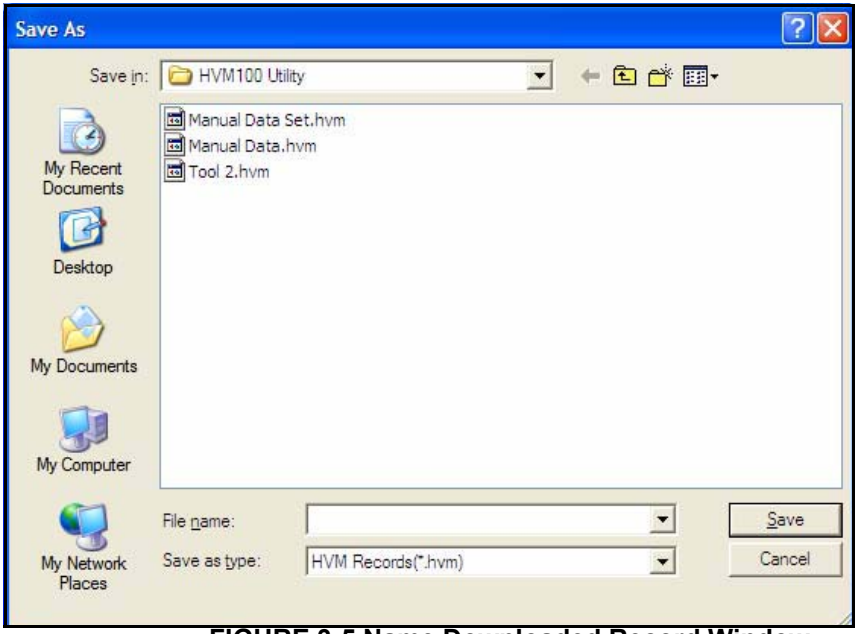


FIGURE 3-5 Name Downloaded Record Window

Left click the down arrow to the right of the “Save in:” field at the top of the screen to set the path to the folder into which the record is to be saved.

*Note that vibration measurement data are saved in files having the format *.hvm.*

Use the keypad to enter a name into the “File name:” field and left click **Save** to save the downloaded data into the designated folder under the name just defined.

After the data has been saved, the Opening Screen shown in Figure 3-1 will reappear. To work with the data, left click either the “HAND/ARM MODE” box or the “Whole Body Mode” box depending on which type of data has just been downloaded. Proceed to the appropriate chapter in this manual to continue, Chapter 4 "Hand/Arm Mode" on page 4-1 or Chapter 5 "Whole Body Mode" on page 5-1.

CHAPTER

4 Hand/Arm Mode

Vibration measurements downloaded from the HVM 100 are saved in records of format *.hvm as described in Chapter 3 "Download Data" on page 3-1. These need to be placed into data base files before they can be used and their data displayed. This chapter addresses hand/arm databases and their use.

Selecting a Data Type

The HVM Utility can work with the two types of measured vibration data listed below. Separate routines are used for each of these data types.

•Hand/Arm Data

•Whole Body Data

To select to work with Hand-Arm vibration data, left click the HAND/ARM MODE box in the Opening Screen as shown in Figure 4-1

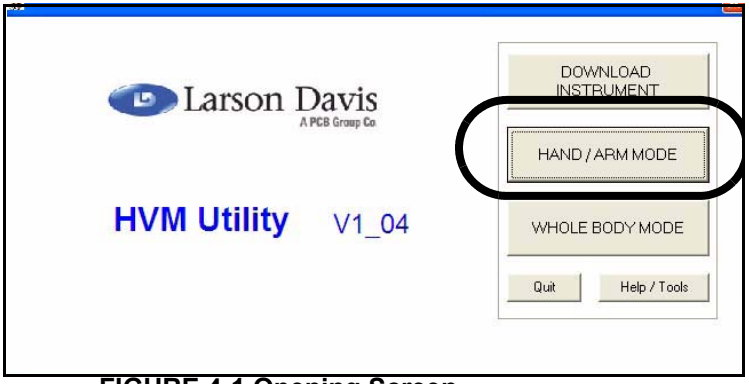


FIGURE 4-1 Opening Screen

This will open the HAND/ARM MODE main menu shown in Figure 4-2.

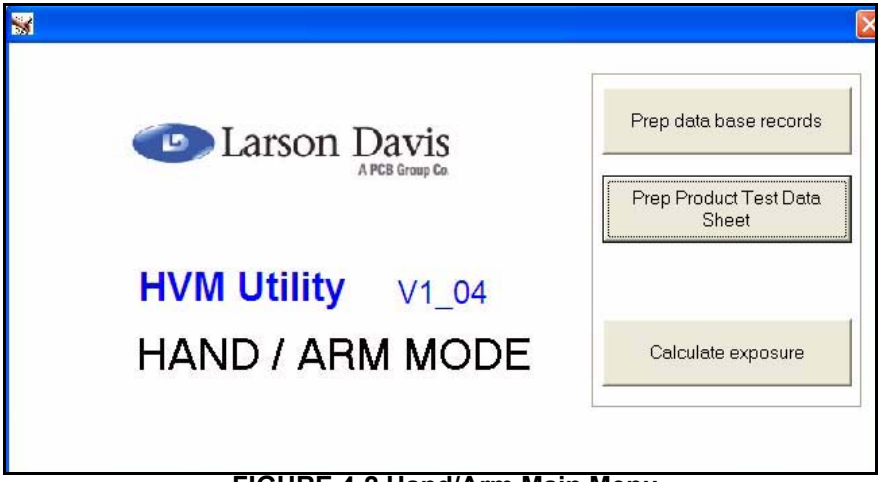


FIGURE 4-2 Hand/Arm Main Menu

Creating a New Database File

A Tools Database is built upon a measured vibration record of format *.hvm.

To create a new database, left click the “Prep database records” box which will bring up the display shown in FIGURE 4-3.

FIGURE 4-3 Open HVM Record Display

Left click **OK** to continue, or left click **Cancel** to abort the process.

Selection of an HVM Record

After clicking **OK**, the window shown in Figure 4-4 will be opened to permit the selection of an HVM record to be opened.

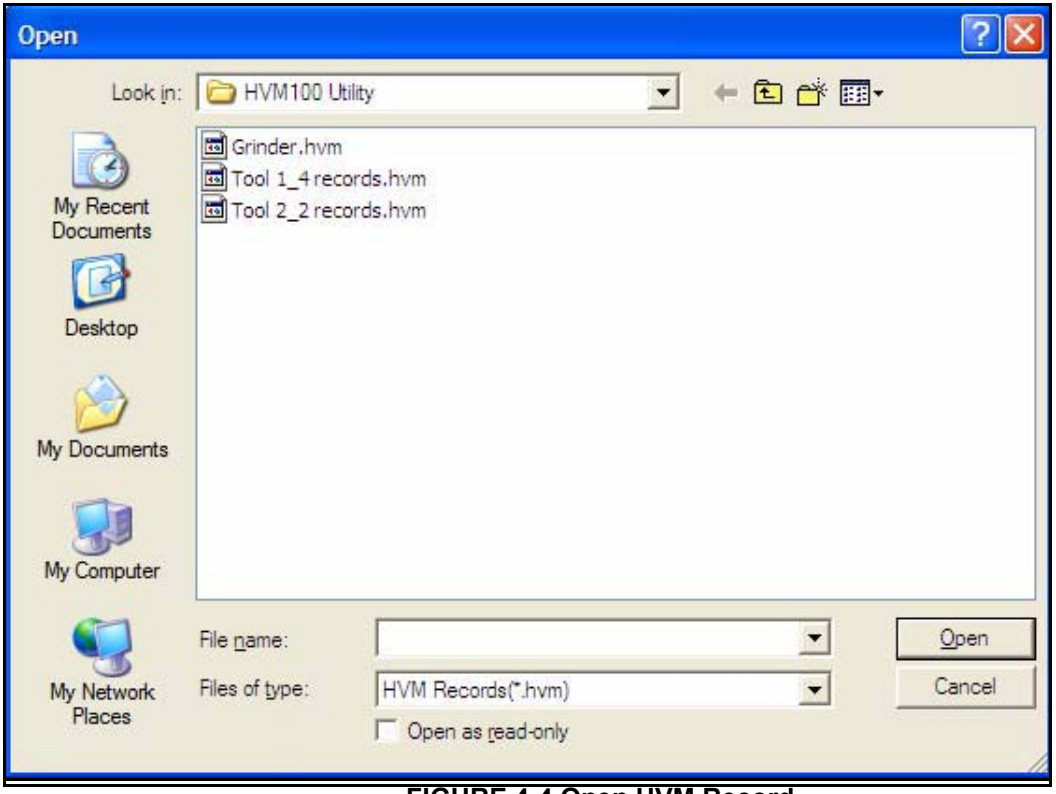


FIGURE 4-4 Open HVM Record

For our example, we will open "Tool 1_4 records.

Highlight the desired record with the cursor and left click **Open** to make a selection.

After the HVM record has been opened, the window shown in Figure 4-5 will be displayed prompting the user to either open an existing data file or to create a new one.

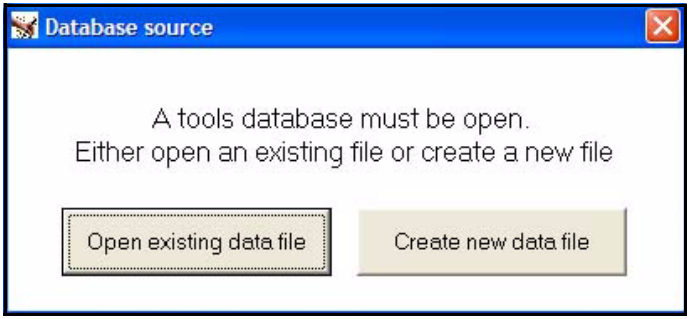


FIGURE 4-5 Opening a Tools Database File

To create a new database file, left click the “Create new data file” box which will open the display shown in FIGURE 4-6.

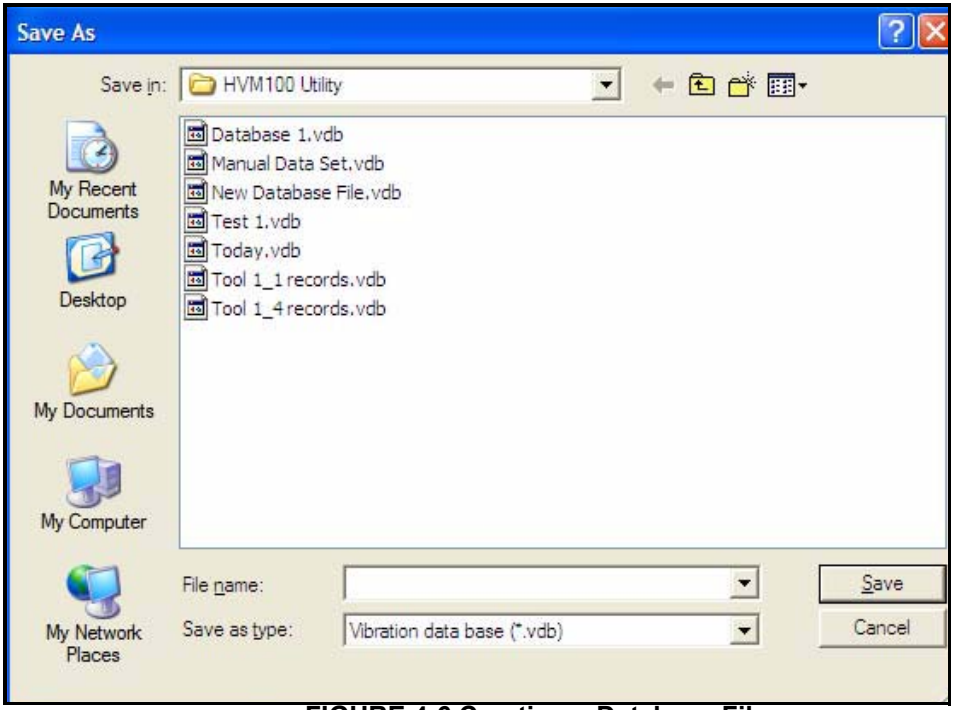


FIGURE 4-6 Creating a Database File

Use the keypad to enter the name of the new database file into the “File name:” field and left click **Save**.

Opening an Existing Database

As indicated in Figure 4-5 on page 4-5, the user has the choice of either creating a new database or opening an existing database. To open an existing database, left click the “Open existing database file” box to open the same display shown in Figure 4-6 on page 4-5.

Instead of entering the name of a new database file as was done in "Creating a New Database File" on page 4-3, highlight one of the existing file names listed in the window and left click **OK** to open it.

Data Viewing and Averaging

When the database is opened, be it a previously existing one or one that was just created, the display will look as shown in FIGURE 4-7.

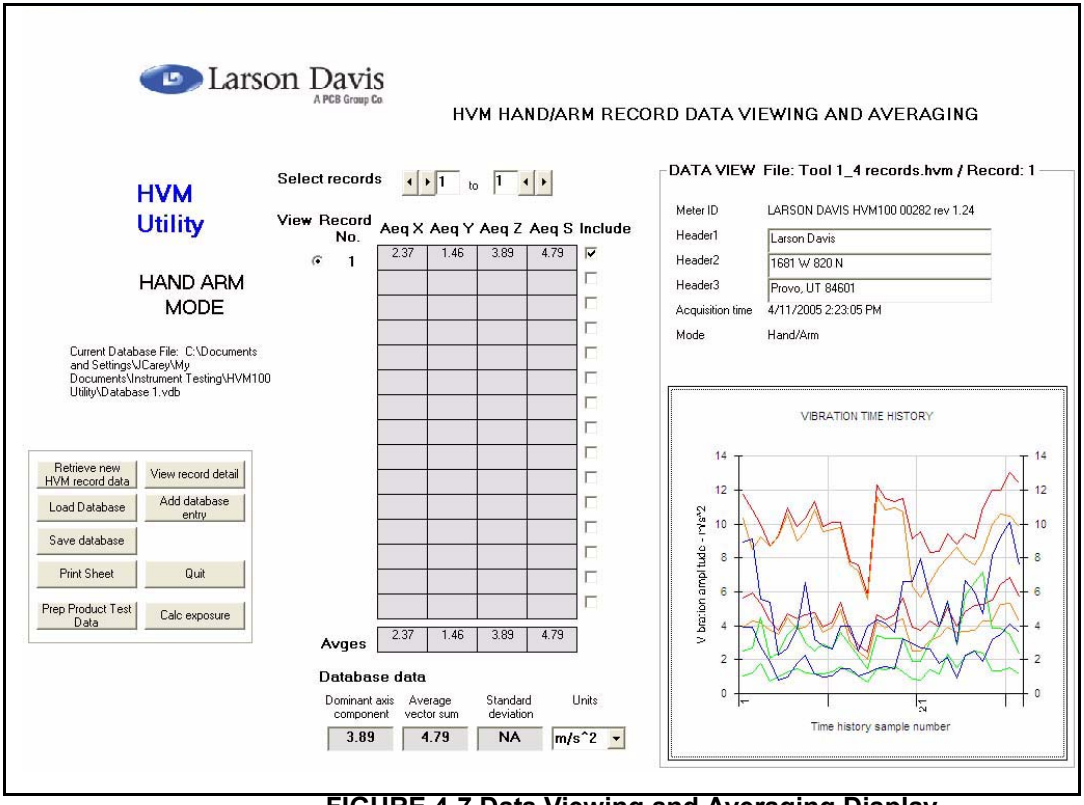


FIGURE 4-7 Data Viewing and Averaging Display

An expanded view of the lower left corner of this display is shown in FIGURE 4-8.

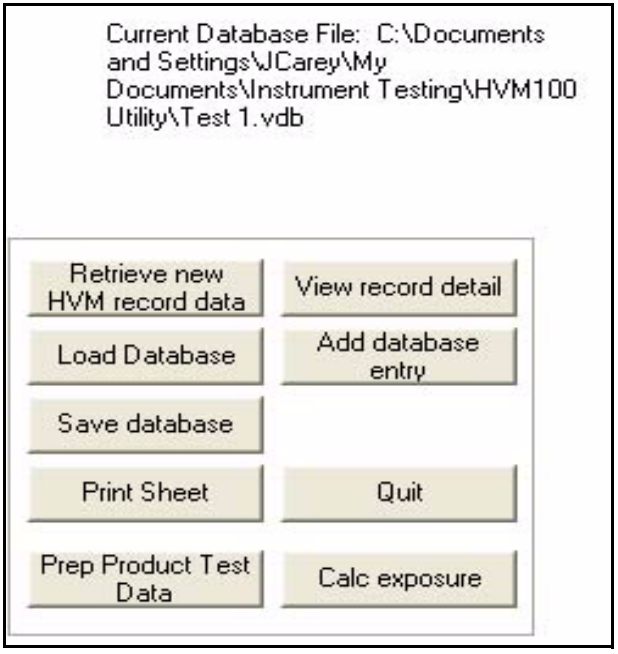


FIGURE 4-8 Controls and Database Reference

In the lower portion of Figure 4-8 we see nine control boxes, each named according to its functionality. The use of these will be described in the following sections.

The name of the database being used (Test1.vdb) and its path are displayed in the upper portion.

Select Records Display

An expanded view of the select records portion of Figure 4-7 is shown in FIGURE 4-9.

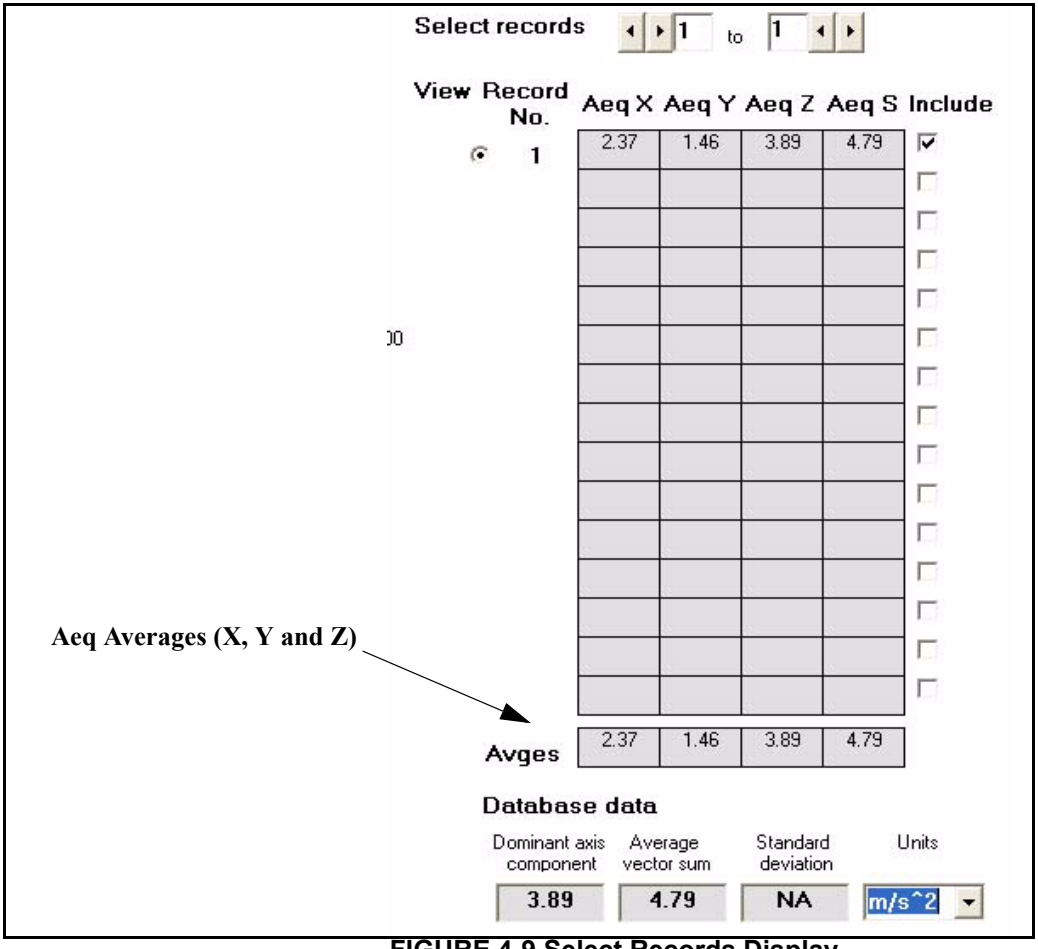


FIGURE 4-9 Select Records Display

Each data file can contain up to 100 records, 15 of which can be seen at one time in this display.

Note that Select records at the top of the display is set to "1 to 1", which is why only a single record is shown.

The file which we are displaying contains four records, although only the first is shown when the display is first presented. As a result, the Aeq averages (X, Y and Z) are identical to these of the record itself and the data for the

dominant axis component and average vector sum, shown at the bottom in units of m/s^2, correspond to this single record.

Note that the Standard deviation has no value (NA) since there is only a single value for each parameter.

Units Selection

There are six different units which can be used to represent the Database data displayed at the bottom of the display. To make a unit selection, left click on the down arrow to the right of the Units field, which will open a drop down menu listing the possible selections as shown in FIGURE 4-10.

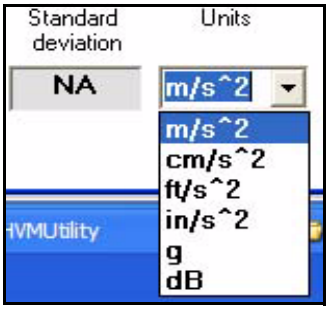


FIGURE 4-10 Selection of Display Units

Left click the desired unit to make a selection.

Selecting a Different Record

As mentioned above, when first displayed only the first record of a multiple record database is shown. Also, the "Select records" field at the top is as shown in FIGURE 4-11.

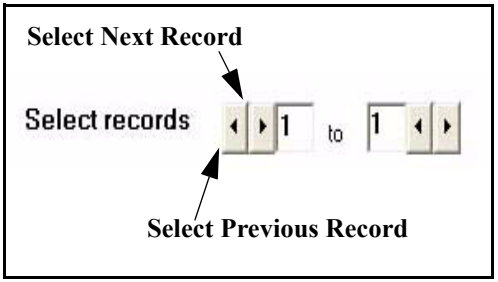


FIGURE 4-11 Select Records, 1 to 1

To select the next record in sequence, left click the right arrow of the first left/right arrow pair as indicated in FIGURE 4-11. Once beyond the first record, left click the left arrow of the first left/right arrow pair to select the previous record in sequence. The basic display will not change except that the data will now correspond to a different record.

Multiple Records

In a multiple record file, the range of records to be displayed is set by selecting both the lower and upper record numbers using the corresponding left/right arrow pairs as shown in FIGURE 4-12.

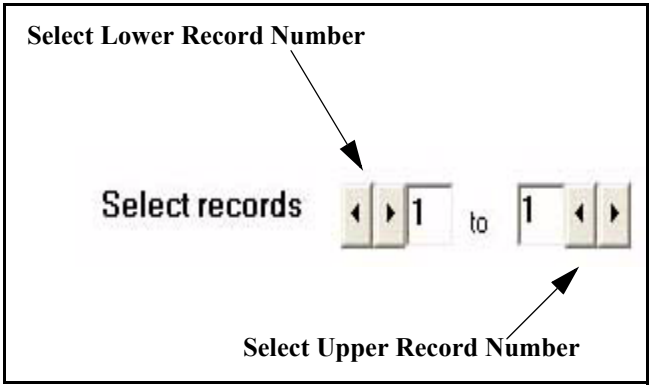


FIGURE 4-12 Selecting a Range of Records

In the case of our example file which contains four records, in order to select all four records, we can left click the right arrow of the second left/right arrow pair three time until the range is records 1 to 4 as shown in FIGURE 4-13.

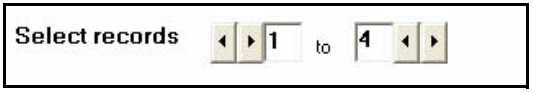


FIGURE 4-13 Select Records 1 to 4

The data display of these records will now look as shown in FIGURE 4-14.

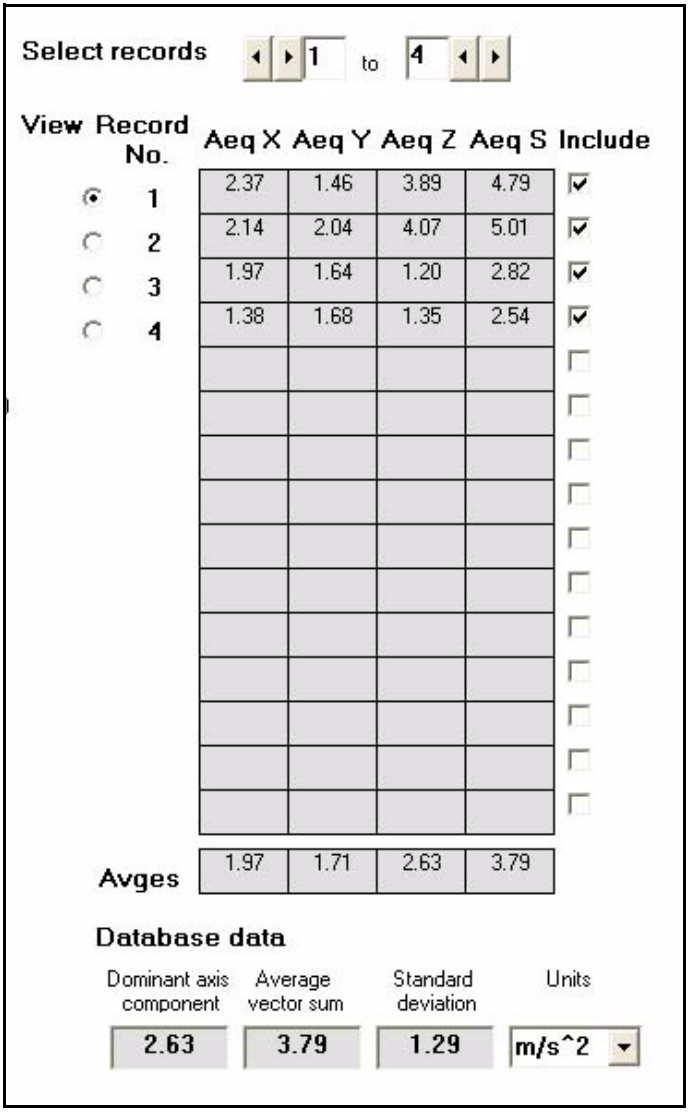


FIGURE 4-14 Four Record Display

Note that the Standard Deviation is only shown when there are at least four records included.

We can now see the data for each of the four records.

Averaging Records

By averaging multiple records, it is possible to obtain typical vibration values. For example, by having multiple operators perform the same operation and averaging the records for each, a more typical set of data can be obtained to represent that tool for that specific operation.

In the United Kingdom, on the other hand, the legislation specifies that the database should provide an averaged record for both high and low usage.

Note that when selecting to view more records, the "Include" check box to the right of each record is automatically checked. Individual records can be unchecked by left clicking on the already checked check box, which will remove their data from the averaging process.

The Aeq Average (X, Y and Z) values displayed in "Four Record Display" on page 4-12 now represent the average values for the four records and the Database data at the bottom corresponds to the four records.

Also, since there are multiple records, a Standard deviation value for the Aeq values is displayed. There must be at least four records in the average in order for the standard deviation to be displayed.

Selecting Record for Graphic Display

When only a single record has been selected, the graph in the lower right of the display will be for that record, as shown in Figure 4-7 on page 4-7.

When multiple records have been selected, the graphic will correspond to the record which has been selected in the View Record section of the display, as shown in FIGURE 4-15.

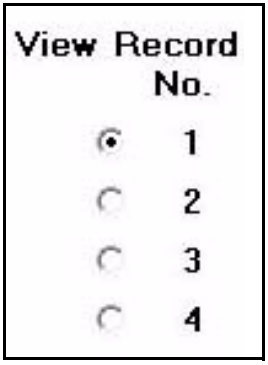


FIGURE 4-15 View Record Number

To make a selection, left click in the circle to the left of the record number which is to be displayed.

Graphic Display, Detailed View

To obtain a detailed view of the graphic display, double click inside the graphic display or left click the "View record detail" box as shown in FIGURE 4-16.

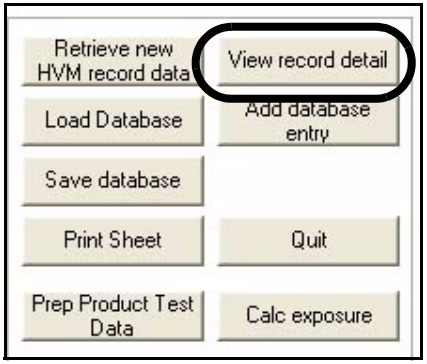


FIGURE 4-16 View Record Detail

This is produce a larger, interactive time history display as shown in FIGURE 4-17.

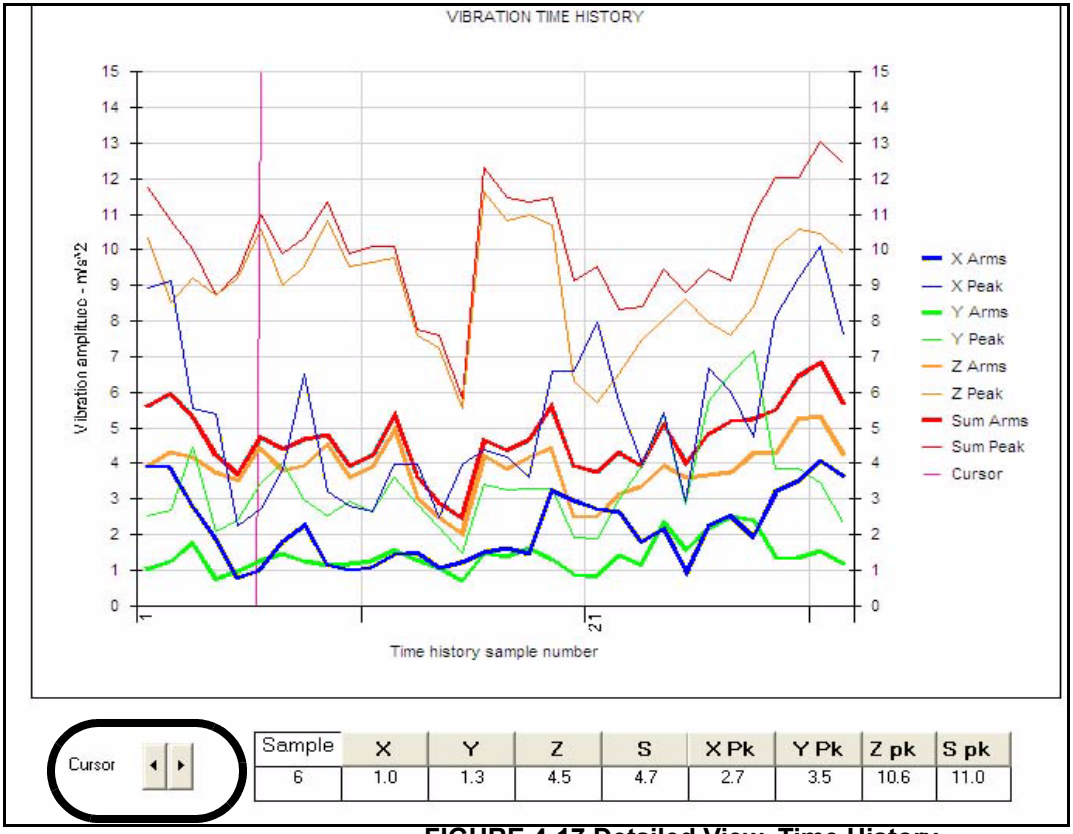


FIGURE 4-17 Detailed View, Time History

There are separate curves for RMS values (X, Y, Z and Sum) and Peak values (X, Y, Z and Sum).

Highlighting an Individual Trace

An individual trace can be highlighted, with all sample values clearly identified as shown in Figure 4-17, by left clicking on any sample value or left clicking on its line type in the legend on the right of the graph.

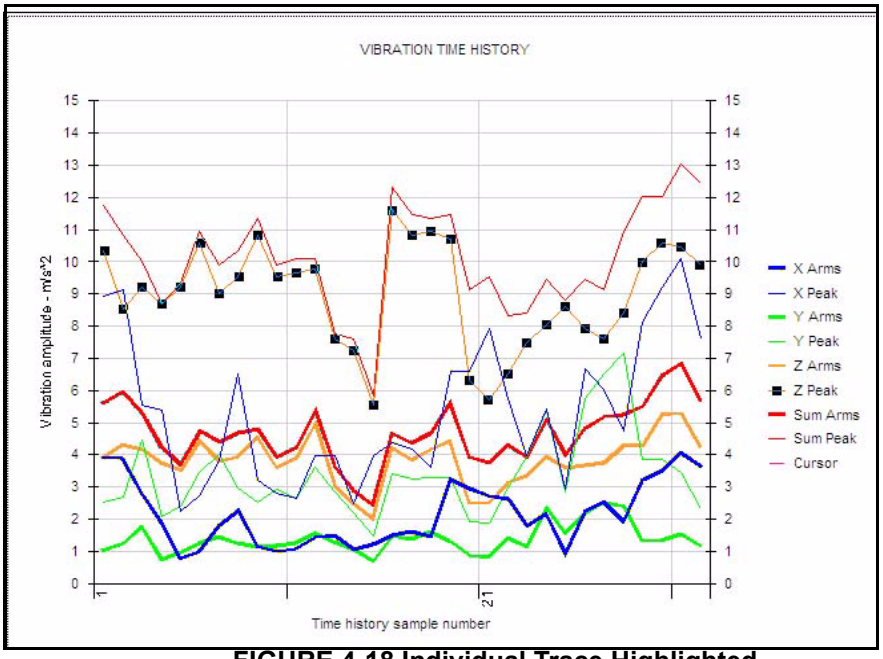


FIGURE 4-18 Individual Trace Highlighted

Cursor and Digital Parameter Display

A cursor can be moved along the time axis using the left and right arrow keys to the lower left of the screen. Digital values of each of these parameters for the time corresponding to the cursor position are displayed at the bottom of the display.

Vertical Axis Scaling

To set the upper limit of the vertical axis, left click the "Set Ymax" box shown in FIGURE 4-19.

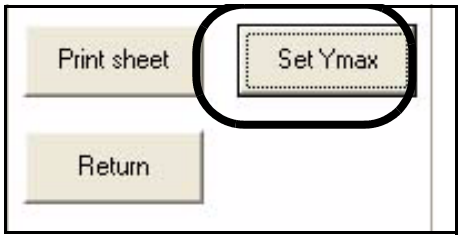


FIGURE 4-19 Set Vertical Axis Scale

This will open the window shown in FIGURE 4-20.

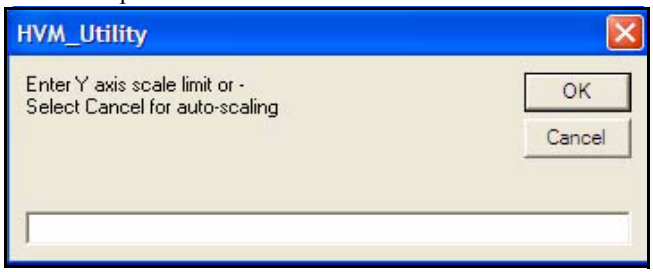


FIGURE 4-20 Selection of Vertical Axis Maximum

Enter a numerical value for the maximum of the vertical scale and press **OK**.

Pressing **Cancel** will cause the vertical axis to be auto scaled based on the values of the data being displayed.

Display of RMS Levels

Note that in the detailed view, the RMS levels for the displayed record appear in a table to the left of the graph, as shown in FIGURE 4-21.

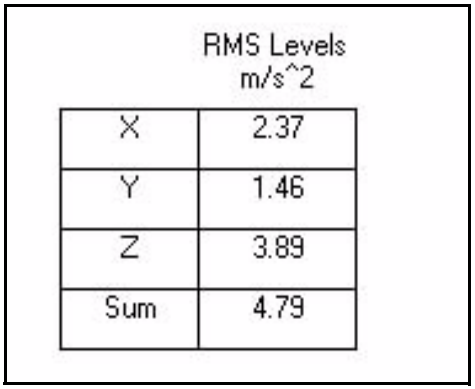


FIGURE 4-21 RMS Values, Detailed View

These are the same values of Aeq (X, Y and Z) which are displayed for the record selected for view in the standard display (see Figure 4-14 on page 4-12 for an example).

Print Detailed View

To print the detailed view, left click the “Print sheet” box as shown in FIGURE 4-22.

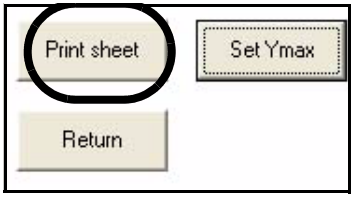


FIGURE 4-22 Print Detailed View

Return to Standard View

To return to the standard view, left click the “Return” box as shown in FIGURE 4-23.

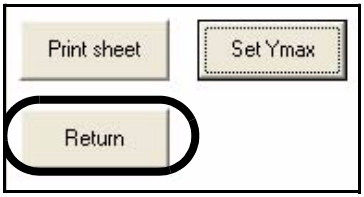


FIGURE 4-23 Return to Standard View

Document Database

Adding a Database Record

A Database Record can be added to the database to identify the tool whose vibration had been measured and the conditions under which the test was performed. From the standard display, left click the "Add database entry" box as shown in FIGURE 4-24.

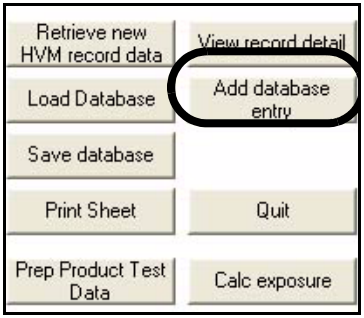


FIGURE 4-24 Add Database Record

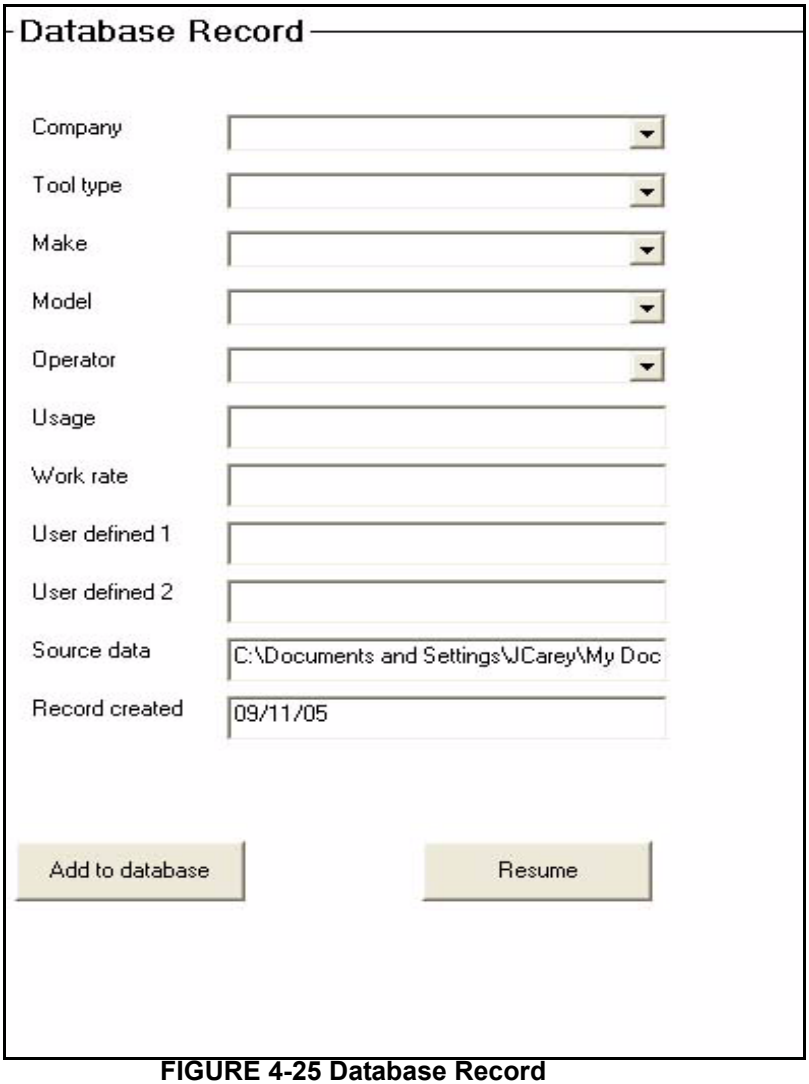


FIGURE 4-25 Database Record

The database plays a key role in the calculation of vibration exposure and also for the creation of test data sheets which will be described in detail in following chapters. As will be seen later in this manual, the user will be able to use the text entered into the Company, Tool Type, Make, Model and Operator fields of the various database records to select items to be used for the calculation of daily exposure and the creation of Product Test Data Sheets.

One database record might be used for a single tool performing a specific task; say surface grinding a particular type of casting made of a particular material. If more than one record were contained in the measurement data file, say for different workers performing the same task, this database could be used either to represent the vibration to which each of the different operators were exposed or to calculate average vibration characteristics representing a more generic user.

Or, the database might include data corresponding to both high and low usage for a single tool, as required in the United Kingdom.

In the "Daily Exposure Assessment" on page 4-28 it will be shown how daily exposure profiles can be generated for a worker performing multiple tasks with different tools using different databases for each of these tools performing different tasks.

Adding Record to Database

Left click the “Add to database” box to add the record created above to the database and return to the standard view.

Exit from Creation of Database

If you wish to exit from the creation of the database without adding the record, left click the “Resume” box which will open the window shown in FIGURE 4-26.

FIGURE 4-26 Warning: Data Not Added to Database

Left click the “Yes” box to return to the standard display without adding the record to the database.

Save Database

Left click the "Save database" box shown in Figure 4-27 to save the database.

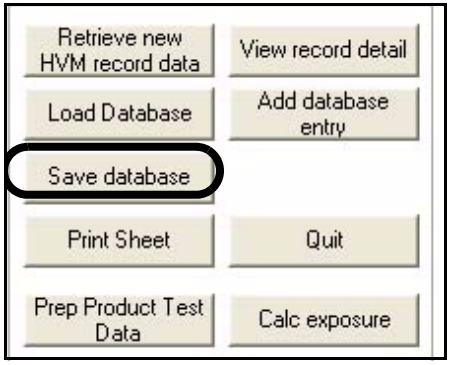


FIGURE 4-27 Save Database

Retrieve New HVM Record Data

To work with a different *.hvm record, rather than exiting from the program and beginning again, left click the "Retrieve new HVM record data" box as shown in FIGURE 4-28..

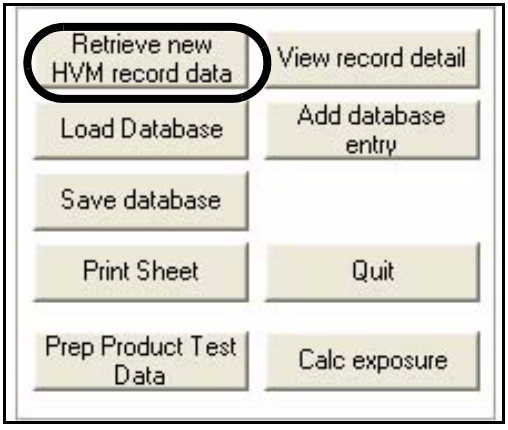


FIGURE 4-28 Retrieve New HVM Record

Multiple Tool Database

When you have created databases for individual tools, these can be combined to create a multiple tool database. This is done be loading additional databases one at a time

Load Database

When a database record has been created and saved, the user may wish to calculate daily exposure using this data record immediately, which would be done by left clicking the “Calc exposure” box. However, if it is desired to add another existing database record instead, left clicking the “Load Database” box as shown FIGURE 4-29 will initiate this process.

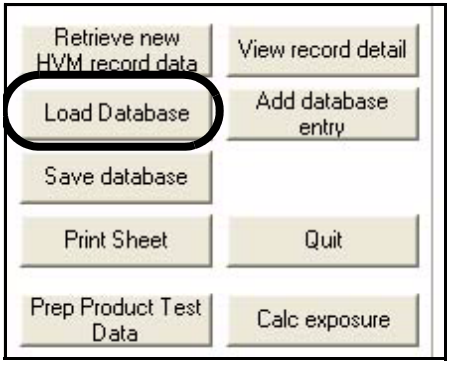


FIGURE 4-29 Load Database

To illustrate the procedure by an example, suppose we have four tool databases named as follows:

•XYZ Corporation_Tool 1

•XYZ Corporation_Tool 2

•:XYZ Corporation_Tool 3

•XYZ Corporation_Tool 4

The information in these database records are as follows:.

Database Name	*Company*	*Tool Type*	*Make*	*Model*	*Operator*
XYZ Corporation Tool 1	XYZ Corporation	Tool 1	Acme	Heavy-weight	Tom
XYZ Corporation Tool 1	XYZ Corporation	Tool 2	Acme	Standard	Joe
XYZ Corporation Tool 1	XYZ Corporation	Tool 3	Acme	Dual Han-dle	Dick
XYZ Corporation Tool 1	XYZ Corporation	Tool 4	Acme	Heavy Duty	Harry

Table 4-1 Multiple Database Example

We begin by loading the database XYZ Corporation_Tool 1 using the procedure described in "Opening an Existing Database" on page 4-6. Then we left click **Load Database**, which opens the database selection menu shown in Figure 4-29.

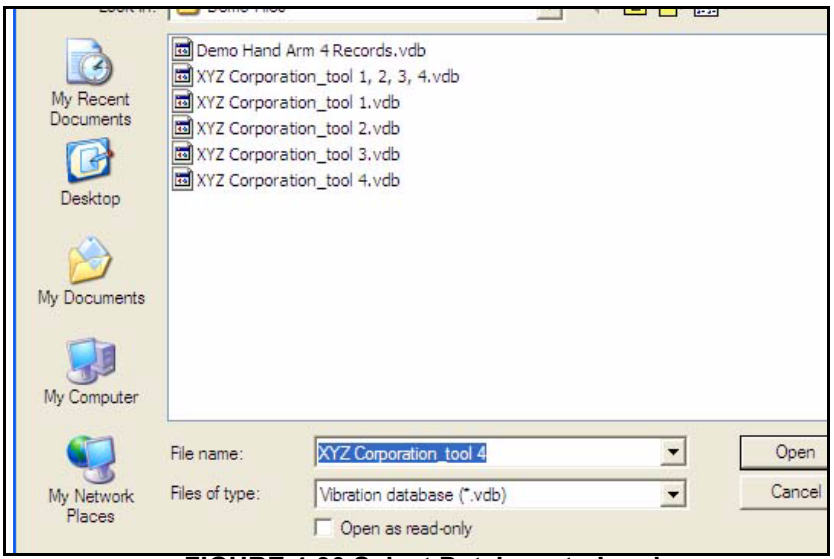


FIGURE 4-30 Select Database to Load

Select to load the database file XYZ Corporation_Tool 2.

Repeat the process two more time, loading XYZ Corporation_Tool 3 and XYZ Corporation_Tool 4. To save for future use, left click **Save Database**.

If we now look at the database entries by left clicking **Add database** entry, we will see that the Tool, Model and Operator fields have multiple entries as shown below.

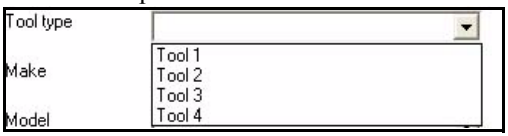


FIGURE 4-31 Multiple Tools

FIGURE 4-32 Multiple Models

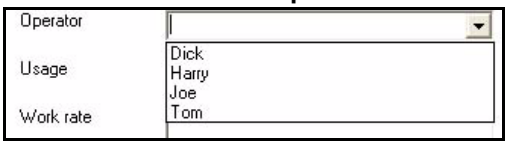


FIGURE 4-33 Multiple Operators

Print Data Viewing and Averaging Display

To print the Data Viewing and Averaging Display shown in "Data Viewing and Averaging Display" on page 4-7, left click the “Print sheet” box shown in FIGURE 4-34.

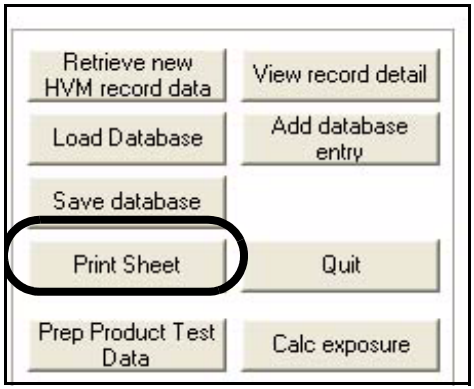


FIGURE 4-34 Print Data Viewing and Averaging Display

Product Test Data Sheet

To access the module for the creation of the product test data sheet, left click the “Prep product test data” box as shown in FIGURE 4-35.

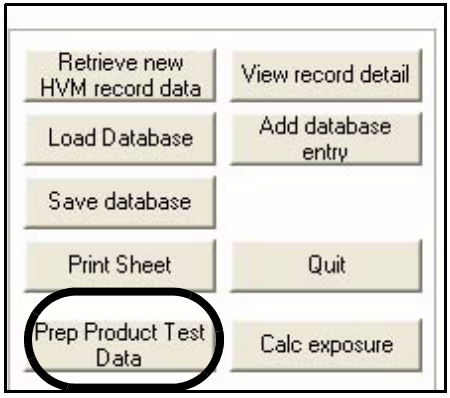


FIGURE 4-35 Access Prepare Product Test Data Module

The creation and use of the product test database is described in detail in Chapter 6 "Product Test Data Sheet" on page 6-1.

Daily Exposure Assessment

To assess the vibration exposure of a worker who may use a variety of tools for various applications, we utilize the databases which we have created which contain vibration data for these tools being used for these applications.

From the Data Viewing and Averaging display, the Daily Exposure Assessment page can be accessed by left clicking the “Calc exposure” box as shown in FIGURE 4-36.

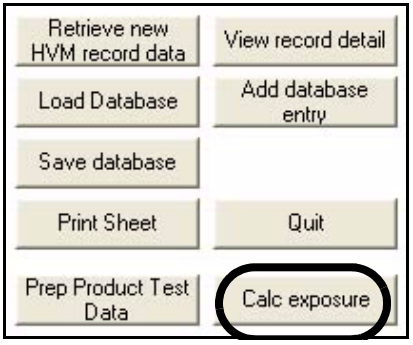


FIGURE 4-36 Access Daily Exposure Assessment Page

The will display the Daily Exposure Assessment Page shown in FIGURE 4-37.

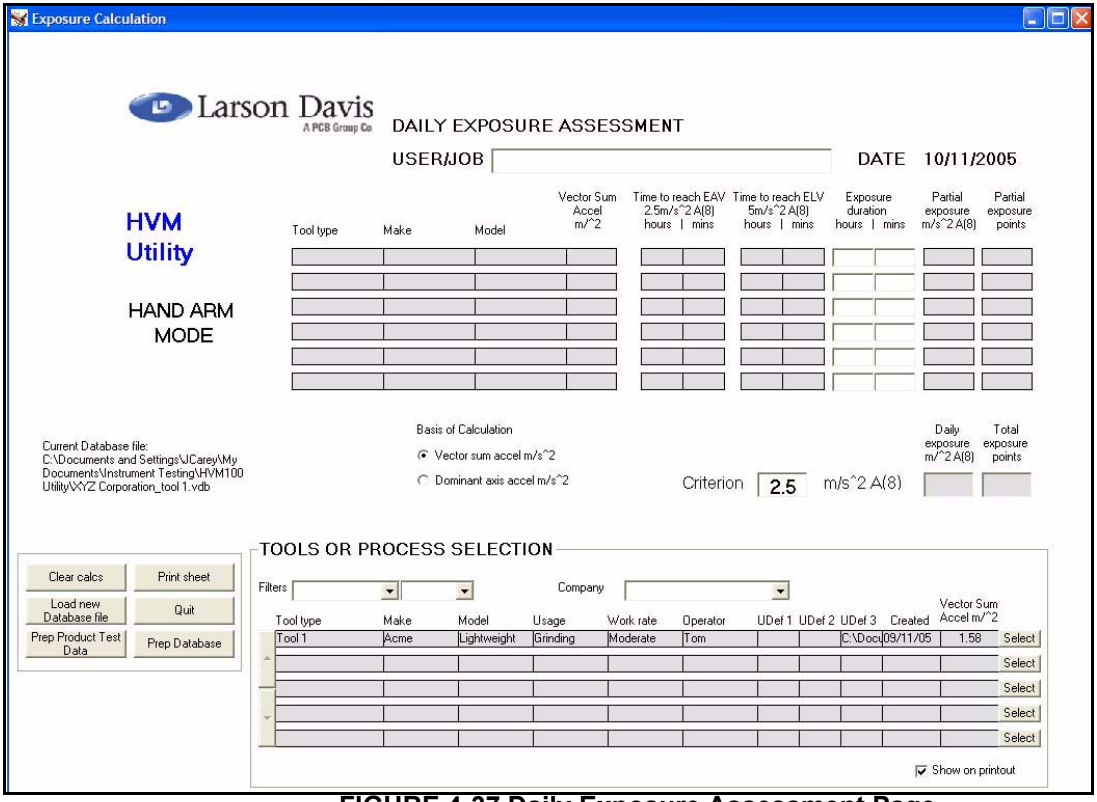


FIGURE 4-37 Daily Exposure Assessment Page

Note: The methodology utilized for the assessment of exposure and certain details of the Daily Exposure Assessment Page depend upon the choice of basis of calculation. This is discussed in detail in the section "Basis of Calculation" on page 4-32. Unless otherwise noted, the displays which appear in this manual are those which appear when using vector sum acceleration as the basis of calculation.

Single Tool, Single Process

We will begin by considering the simplest case where we are dealing with a single tool performing a single process. The selection of tools or processes utilizes the table in lower portion of the Daily Exposer Assessment page shown in FIGURE 4-38.

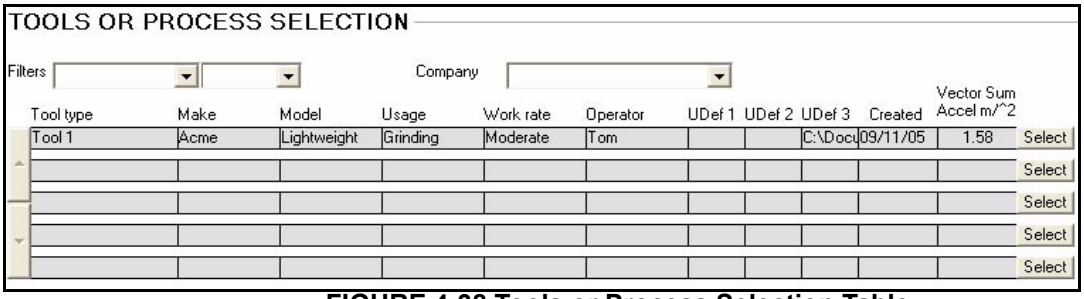


FIGURE 4-38 Tools or Process Selection Table

Database Record Information

Note: The heading of the last column, Vector Sum Accel m/s^2, corresponds to the selection of Vector Acceleration as the basis for calculation. This heading will be different when the basis for calculation is Dominant Axis Accel, as shown in "Tools or Process Selection Table using Dominant Axis Acceleration as Basis for Calculation" on page 4-33.

In the first row of this table appear data from the database which was being used when this page was accessed, in this case data for Tool 1, manufactured by Acme, Lightweight Model, used for Grinding, at a moderate work rate.

Tool or Process Selection

The vibration exposure calculation utilizes the table in the upper portion of the Daily Exposure Assessment page, shown in FIGURE 4-39. Data for particular tools or processes are transferred from rows in the Tools or Process Selection Table to rows in the Vibration Exposure Calculation Table by left clicking on the “Select” box at the right end of the row in the Tools or Process Selection Table.

Since we have only a single row in the Tools or Process Selection Table, it was only necessary to perform this operation once to have the Vibration Exposure Calculation Table appear in the form shown in FIGURE 4-39.

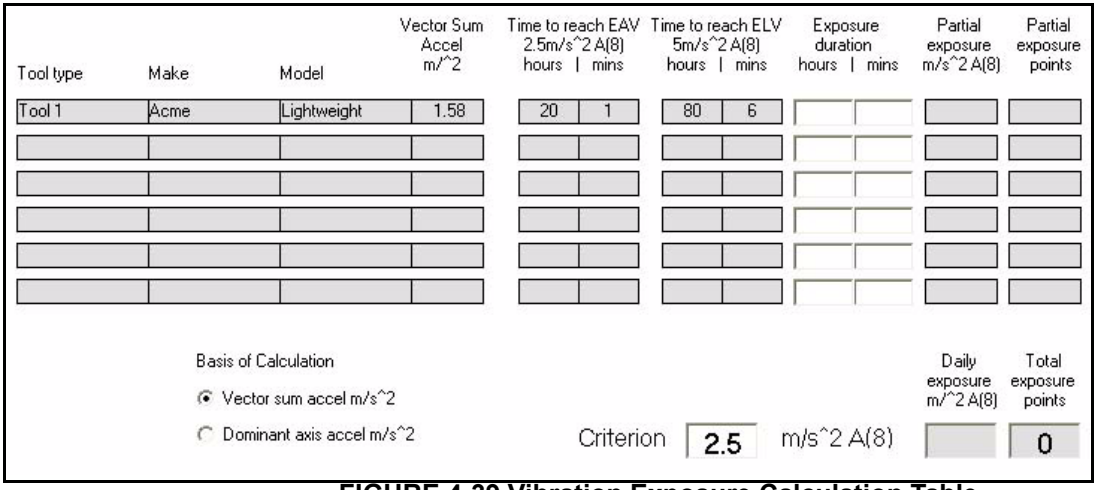


FIGURE 4-39 Vibration Exposure Calculation Table

Exposure Calculation

If the projected daily activity of the worker is to use only Tool1 for a period of four hours and thirty minutes, it is only necessary to enter this value into the boxes for Exposure Time, as indicated in FIGURE 4-39. The exposure is then calculated and displayed as shown in FIGURE 4-40.

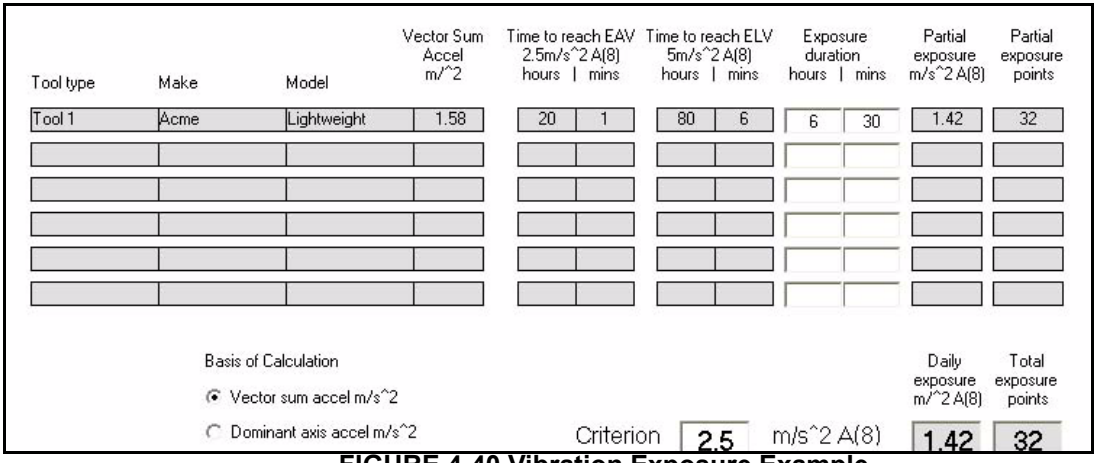


FIGURE 4-40 Vibration Exposure Example

Basis of Calculation

The HVM Utility provides two different criteria which can be used for assessing vibration exposure. The selection is made by checking one of the two options, which appear along with the Vibration Exposure Calculation Table as shown in FIGURE 4-41.

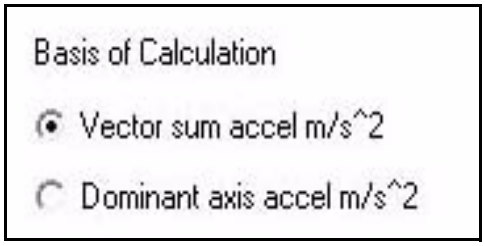


FIGURE 4-41 Basis of Calculation Selection

Vector sum of acceleration, m/s^2

Directive 2002/44/EC of the European Union, also known as the Physical Agents Directive, specifies that the vector sum of the acceleration in units of m/s^2 be used for the assessment of vibration exposure. Further, it defines two parameters of importance for hand-arm vibration as follows:

•Exposure limit value (ELV) standardized to an eight-hour day references period: 5 m/s^2

•Exposure action value (ELA) standardized to an eight-hour day references period: 2.5 m/s^2.

The vibration exposure example shown in Figure 4-40 on page 4-31 uses the vector sum of the acceleration in units of m/s^2.

Dominant axis acceleration, m/s^2

In the United Kingdom it has been the practice to assess vibration exposure in terms of the vibration along the axis having the highest level of vibration in units of m/s^2. They utilize an exposure action value standardized to an eight-hour day of 2.8 m/s^2.

As noted previously, most of the displays presented in this manual correspond to the selection of Vector Acceleration as

the basis for calculation. The Tools or Process Selection Table and the Vibration Exposure Tables appear slightly different when Dominant Axis Acceleration is used as the basis for selection, as shown in Figure 4-42and FIGURE 4-43.

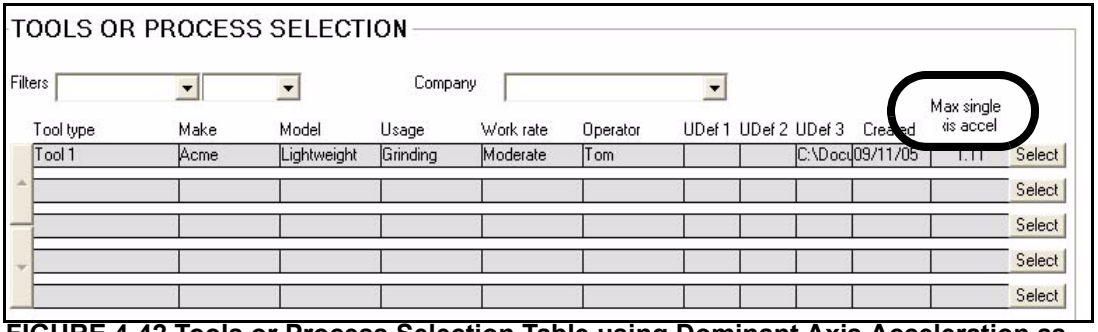


FIGURE 4-42 Tools or Process Selection Table using Dominant Axis Acceleration as Basis for Calculation

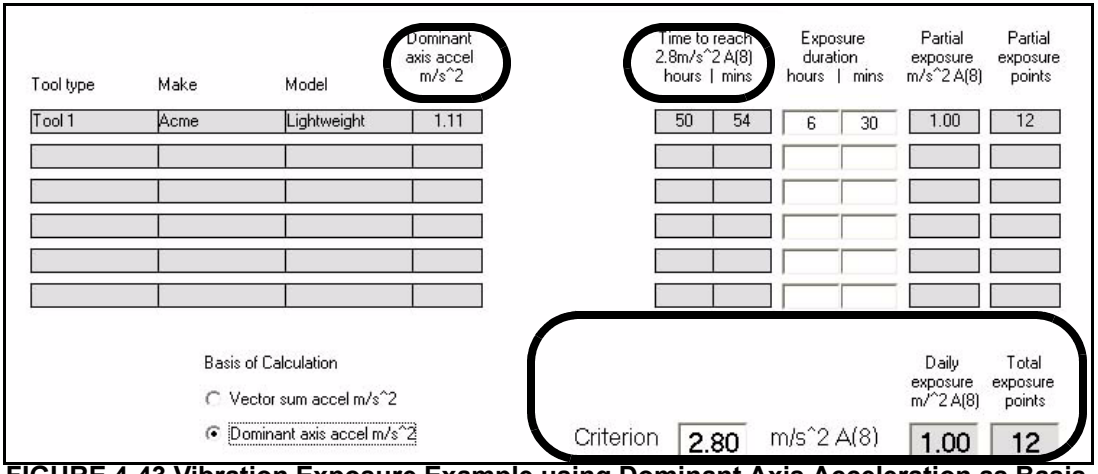


FIGURE 4-43 Vibration Exposure Example using Dominant Axis Acceleration as Basis for Calculation

Note also that the Criteria and exposure values are different than were obtained when using Vector Acceleration for the basis of calculation, as shown in "Vibration Exposure Example" on page 4-31.

This could also be done by creating a single database with multiple tools, as described in "Multiple Tool Database" on page 4-24.

In section "Single Tool, Single Process" on page 4-30 we described how to work with a single database containing data for a single tool performing a single process. We will now work with four databases, each of which has a particular tool performing a specific process. In our example, we will load the database for the first tool. To make things simpler, we will again begin with the database used in "Single Tool, Single Process" on page 4-30, so the the Tools or Process Selection Table will look like Figure 4-38 on page 4-30.

We will now load the database for the next tool. Left click the “Load new database file” box as shown in FIGURE 4-44.

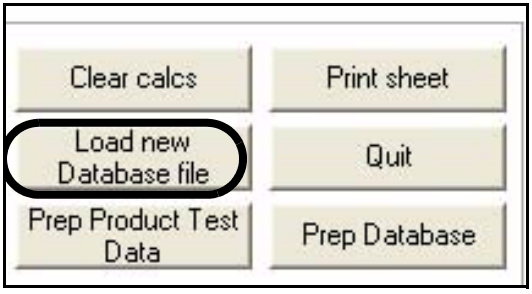


FIGURE 4-44 Load New Database File

This will open the window shown in FIGURE 4-45. to select the database for the next tool.

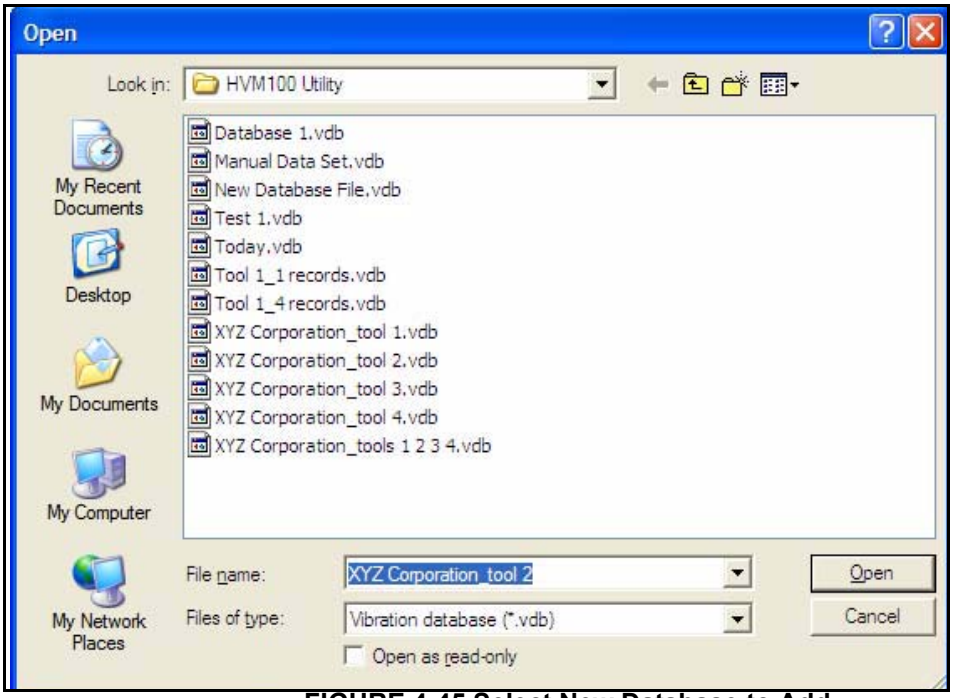
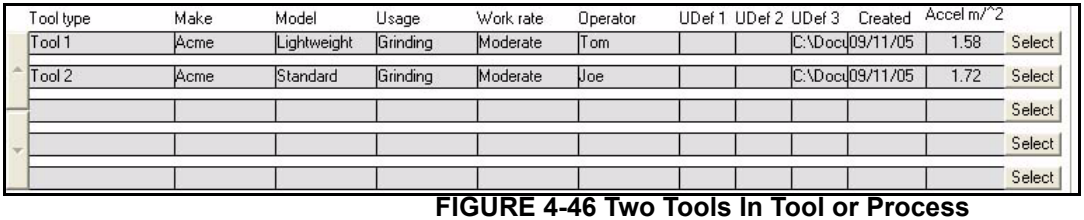


FIGURE 4-45 Select New Database to Add

Highlight the desired database file, in this example XYZ Corporation_tool 2.vbd, and left click **Open**. There will now be two tools in the Tools or Process Selection Table, as shown in FIGURE 4-46.



Tool type	Make	Model	Usage	Work rate	Operator	UDef 1	UDef 2	UDef 3	Created	Accel m/^2	
Tool 1	Acme	Lightweight	Grinding	Moderate	Tom			C:\Docu	09/11/05	1.58	Select
Tool 2	Acme	Standard	Grinding	Moderate	Joe			C:\Docu	09/11/05	1.72	Select
											Select
											Select
											Select

FIGURE 4-46 Two Tools In Tool or Process Selection Table

If we continue in the same manner to add databases for two additional tools, we will have four tools in the Tool or Process Selection Table as shown in FIGURE 4-47.

Tool type	Make	Model	Usage	Work rate	Operator	UDef 1	UDef 2	UDef 3	Created	Vector Sum Accel m/^2	
Tool 1	Acme	Lightweight	Grinding	Moderate	Tom			C:\Doc	09/11/05	1.58	Select
Tool 2	Acme	Standard	Grinding	Moderate	Joe			C:\Doc	09/11/05	1.72	Select
Tool 3	Acme	Dual Handle	Grinding	Heavy	Dick			C:\Doc	09/11/05	1.32	Select
Tool 4	Acme	Heavy Duty	Grinding	Heavy	Harry			C:\Doc	09/11/05	2.48	Select
											Select

FIGURE 4-47 Four Tools In Tool or Process Selection Table

We could, of course, continue to add tools to this table whether we know we will be using them or not.

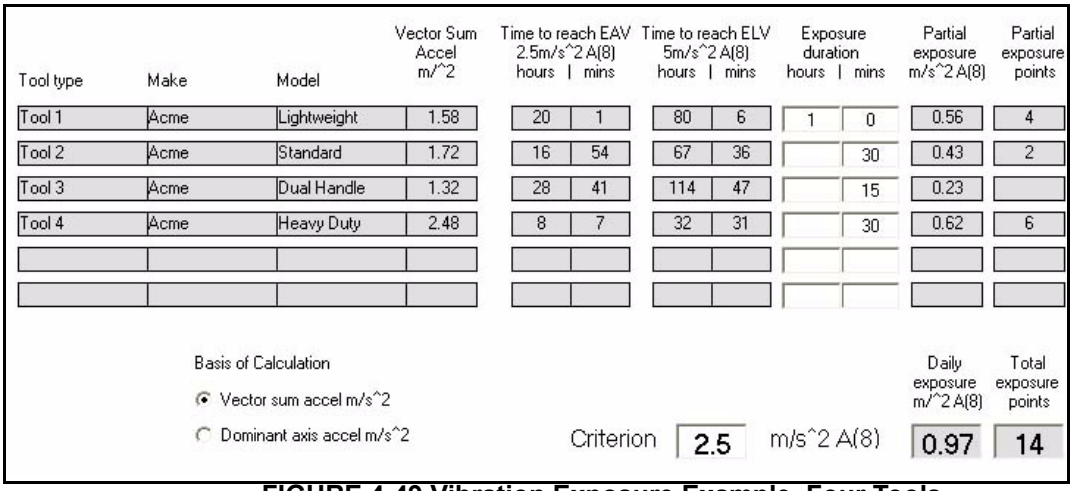
Tool or Process Selection

With multiple tools or processes in the Tool or Process Selection Table, we can one at a time select the ones which are to be used in the vibration exposure calculation by left clicking the “Select” box at the right end of the appropriate row. If we select Tools 1, 2, 3 and 4 in that sequence, the Vibration Exposure Calculation Table will look as shown in FIGURE 4-48.

Tool type	Make	Model	Vector Sum Accel m/^2	Time to reach EAV 2.5m/s^2 A(8) hours	mins	Time to reach ELV 5m/s^2 A(8) hours	mins	Exposure duration hours	mins	Partial exposure m/s^2 A(8)	Partial exposure points
Tool 1	Acme	Lightweight	1.58	20	1	80	6				
Tool 2	Acme	Standard	1.72	16	54	67	36				
Tool 3	Acme	Dual Handle	1.32	28	41	114	47				
Tool 4	Acme	Heavy Duty	2.48	8	7	32	31				

FIGURE 4-48 Vibration Exposure Table, Four Tools

To calculate the daily vibration exposure based on the amount of time each tool is used per day, simply enter the use time values for each tool. The result will be as shown in FIGURE 4-49.



Tool type	Make	Model	Vector Sum Accel m/^2	Time to reach EAV 2.5m/s^2 A(8) hours	mins	Time to reach ELV 5m/s^2 A(8) hours	mins	Exposure duration hours	mins	Partial exposure m/s^2 A(8)	Partial exposure points
Tool 1	Acme	Lightweight	1.58	20	1	80	6	1	0	0.56	4
Tool 2	Acme	Standard	1.72	16	54	67	36		30	0.43	2
Tool 3	Acme	Dual Handle	1.32	28	41	114	47		15	0.23	
Tool 4	Acme	Heavy Duty	2.48	8	7	32	31		30	0.62	6

FIGURE 4-49 Vibration Exposure Example, Four Tools

Print Vibration Exposure Display

To print the Vibration Exposure Display, left click as shown in FIGURE 4-50.

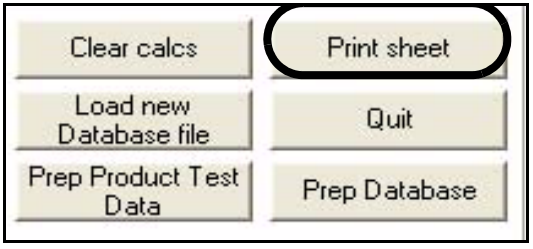


FIGURE 4-50 Print Vibration Exposure Display

Load New Database File

To load a new database file, left click on the "Load new Database file" box, as shown in FIGURE 4-51.

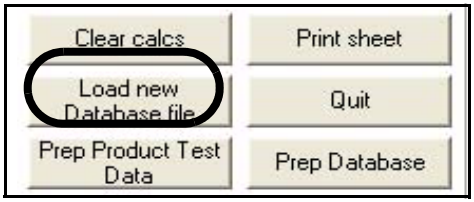


FIGURE 4-51 Load New Database File

Return to Data View and Averaging Display]

To return to the View and Average Display, left click on the "Prep Database" box as shown in FIGURE 4-52.

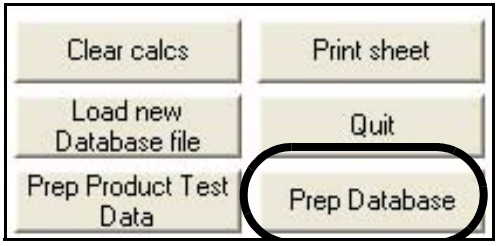


FIGURE 4-52 Return to Data View and Averaging Display

Product Test Data Sheet

To access the module for the creation of a product test data sheet, left click the "Prep Product Test Data" box as shown in FIGURE 4-53.

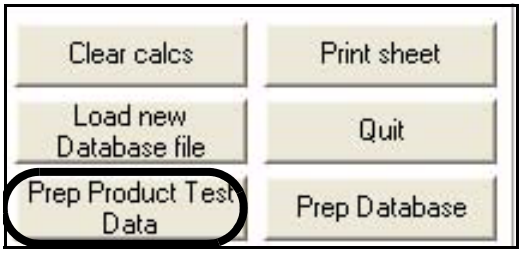


FIGURE 4-53 Access Product Test Data Module

The creation and use of the product test data sheet is described in detail in Chapter 6 "Product Test Data Sheet" on page 6-1.

Quit Hand-Arm Module

To quit the Hand-Arm module, left click the “Quit” box, as shown in FIGURE 4-54.

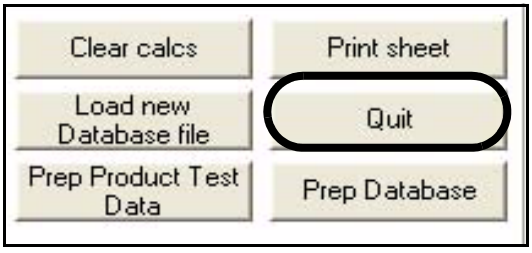


FIGURE 4-54 Quit Hand-Arm Module

This will return to the beginning of the program, with the Opening Screen displayed as shown in FIGURE 4-55.

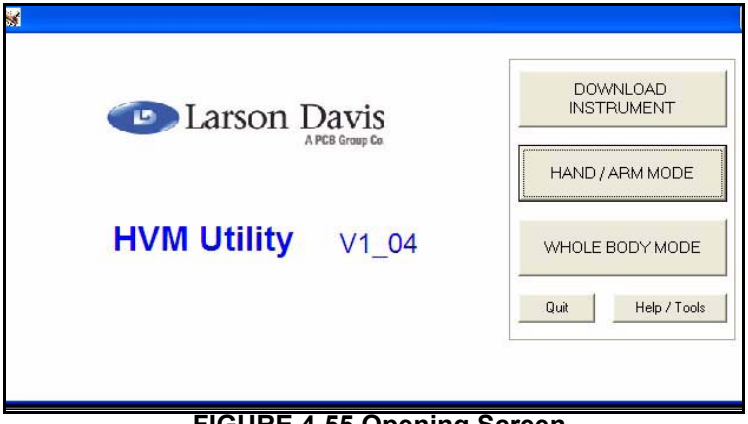


FIGURE 4-55 Opening Screen

CHAPTER

5 Whole Body Mode

Vibration measurements downloaded from the HVM 100 are saved in records of format *.hvm as described in Chapter 3 "Download Data" on page 3-1. These need to be placed into data base files before they can be used and their data displayed. This chapter addresses whole body databases and their use.

Selecting a Data Type

The HVM Utility can work with the two types of measured vibration data listed below. Separate routines are used for each of these data types.

•Hand/Arm Data

•Whole Body Data

To select to work with Hand-Arm vibration data, left click the WHOLE BODY MODE box in the Opening Screen as shown in Figure 5-1.

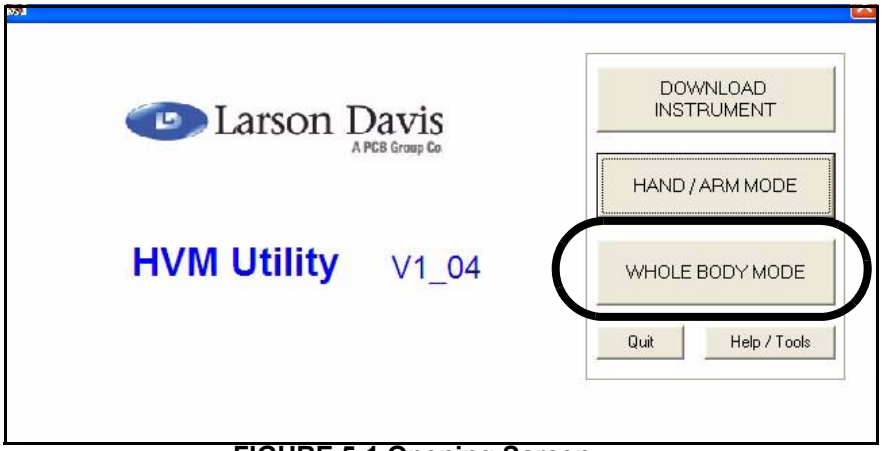


FIGURE 5-1 Opening Screen

This will open the WHOLE BODY MODE main menu shown in Figure 5-2.

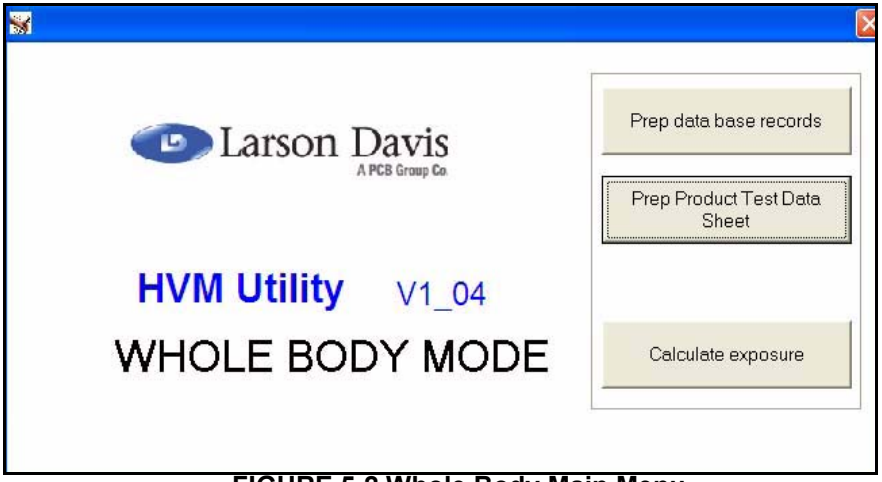


FIGURE 5-2 Whole Body Main Menu

Creating a New Database File

A Tools Database is built upon a measured vibration record of format *.hvm.

To create a new database, left click the “Prep database records” box which will bring up the display shown in FIGURE 5-3.

FIGURE 5-3 Open HVM Record Display

Left click **OK** to continue, or left click **Cancel** to abort the process.

Selection of an HVM Record

After clicking **OK**, the window shown in Figure 5-4 will be opened to permit the selection of an HVM record to be opened.

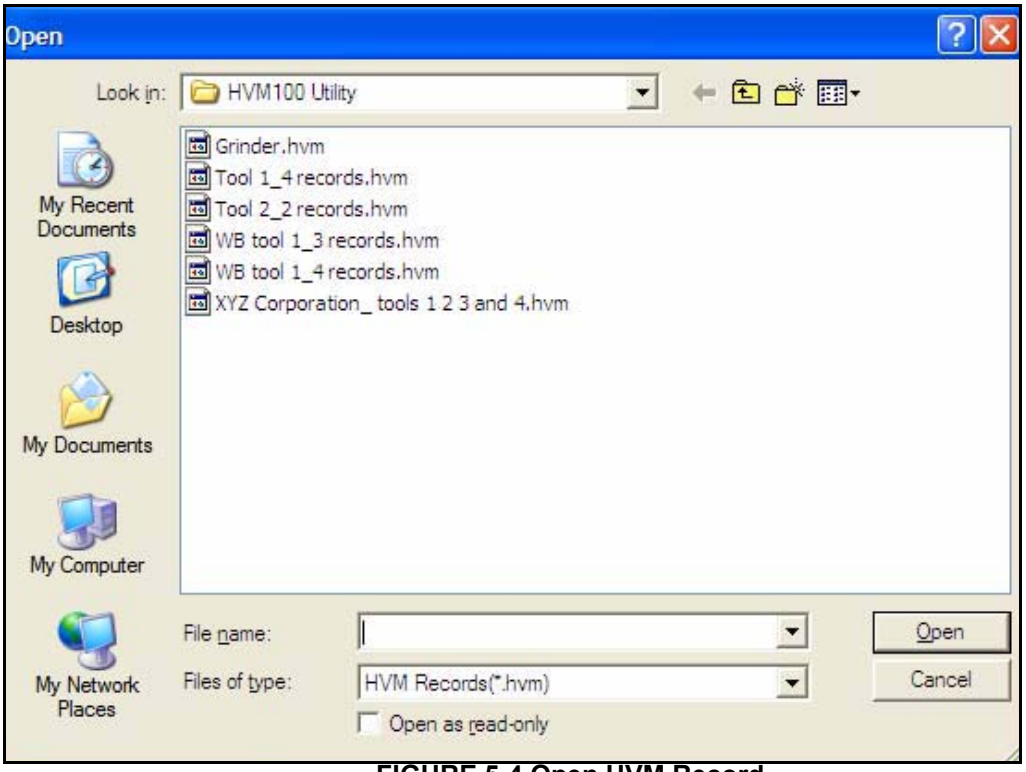


FIGURE 5-4 Open HVM Record

For our example, we will open "WB Tool 1_3 records.

Highlight the desired record with the cursor and left click **Open** to make a selection.

After the HVM record has been opened, the window shown in Figure 5-5 will be displayed prompting the user to either open an existing data file or to create a new one.

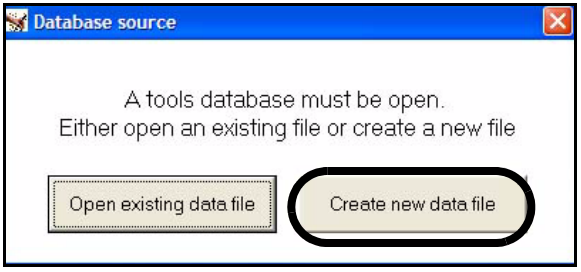


FIGURE 5-5 Opening a Tools Database File

To create a new database file, left click the “Create new data file” box which will open the display shown in FIGURE 5-6.

FIGURE 5-6 Creating a Database File

Use the keypad to enter the name of the new database file into the “File name:” field and left click **Save**.

Opening an Existing Database

As indicated in Figure 5-5 on page 5-4, the user has the choice of either creating a new database or opening an existing database. To open an existing database, left click the “Open existing database file” box to open the same display shown in Figure 5-6 on page 5-5.

Instead of entering the name of a new database file as was done in "Creating a New Database File" on page 5-3, highlight one of the existing file names listed in the window and left click **OK** to open it.

Whole Body Record Data Viewing

When the database is opened, be it a previously existing one or one that was just created, the display will look as shown in FIGURE 5-7.

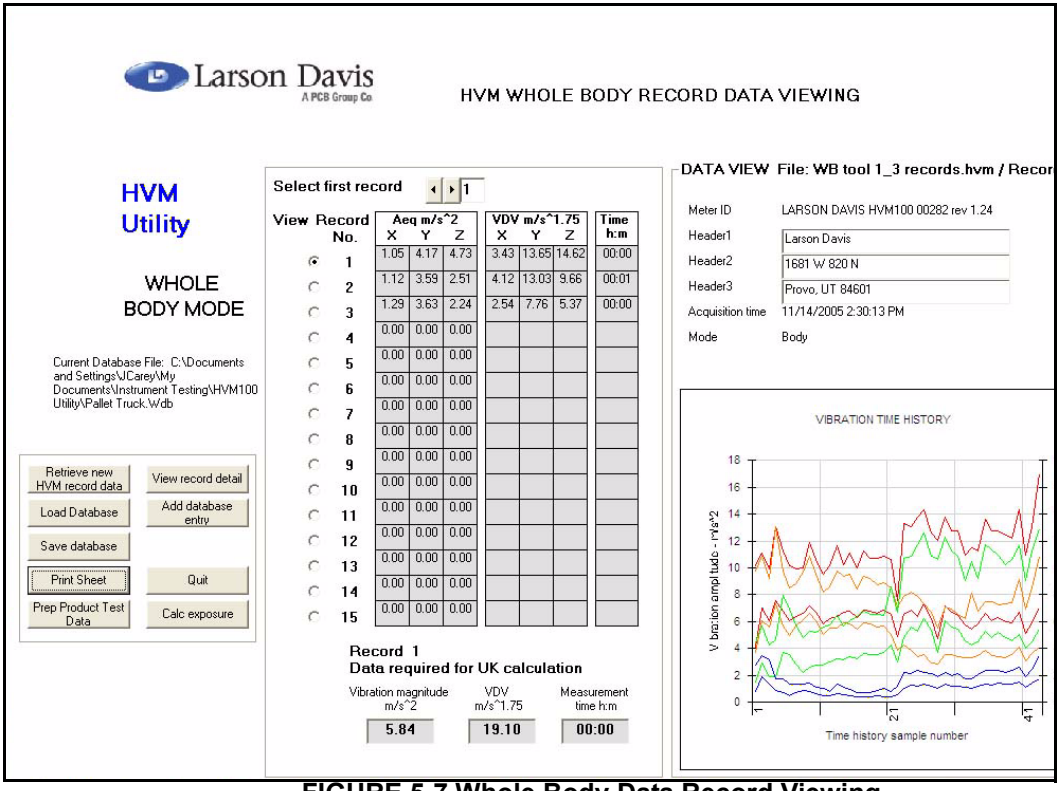


FIGURE 5-7 Whole Body Data Record Viewing

An expanded view of the lower left corner of this display is shown in FIGURE 5-8.

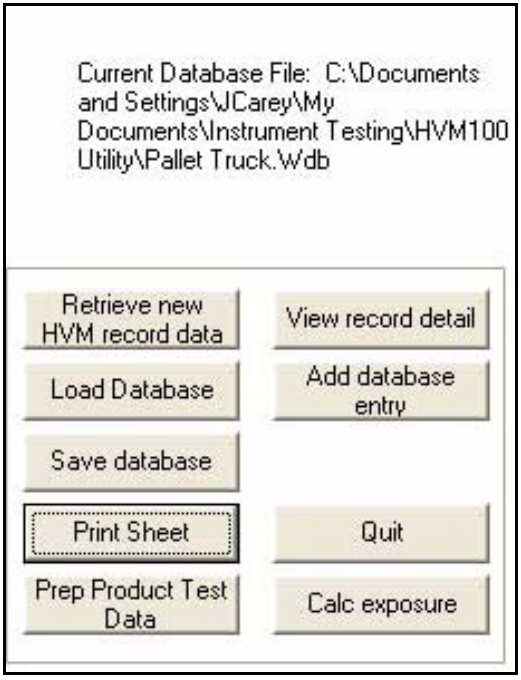


FIGURE 5-8 Controls and Database Reference

In the lower portion of Figure 5-8 we see nine control boxes, each named according to its functionality. The use of these will be described in the following sections.

The name of the database being used (Pallet Truck.wdb) and its path are displayed in the upper portion.

Select Record Display

Note that "Select first record" at the top of the display is set to 1, which is why the listing of records begins with the first record.

An expanded view of the select record portion of Figure 5-7 is shown in FIGURE 5-9.

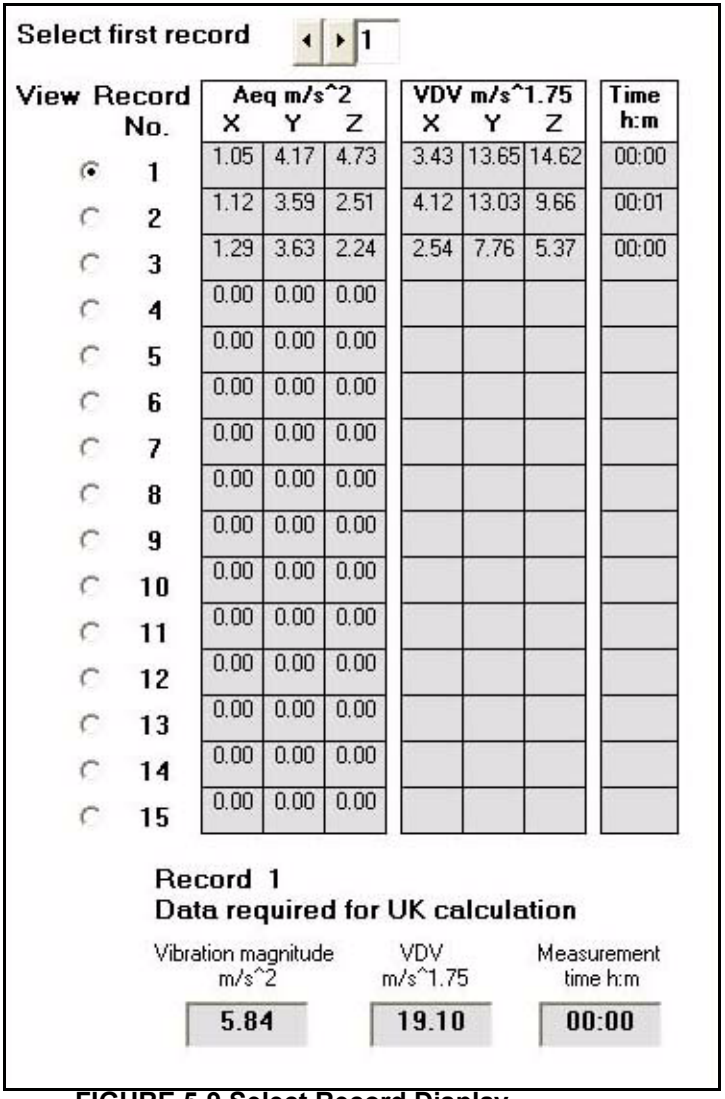


FIGURE 5-9 Select Record Display

Each data file can contain up to 100 records, 15 of which can be seen at one time in this display.

Beginning with a Different Record Number

To begin the listing with a different record number, use the arrows in the field shown in FIGURE 5-10.

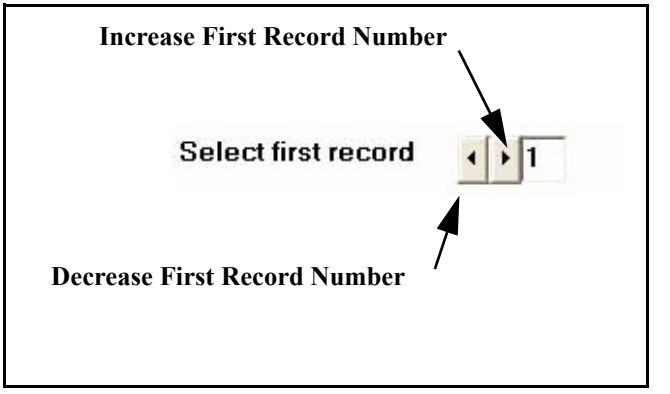


FIGURE 5-10 Selecting First Record Number

Selecting Record for Graphic Display

When only a single record has been selected, the graph in the lower right of the display will be for that record, as shown in Figure 5-7 on page 5-6.

When multiple records have been selected, the graphic will correspond to the record which has been selected in the View Record section of the display, as shown in FIGURE 5-11.

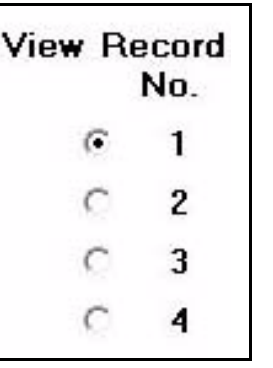


FIGURE 5-11 View Record Number

To make a selection, left click in the circle to the left of the record number which is to be displayed.

Graphic Display, Detailed View

To obtain a detailed view of the graphic display, double click inside the graphic display, or left click the "View record detail" box as shown in FIGURE 5-12.

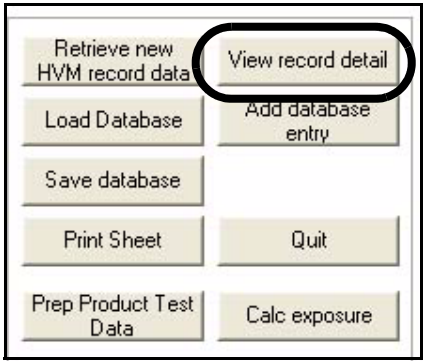


FIGURE 5-12 View Record Detail

This is produce a larger, interactive time history display as shown in FIGURE 5-13.

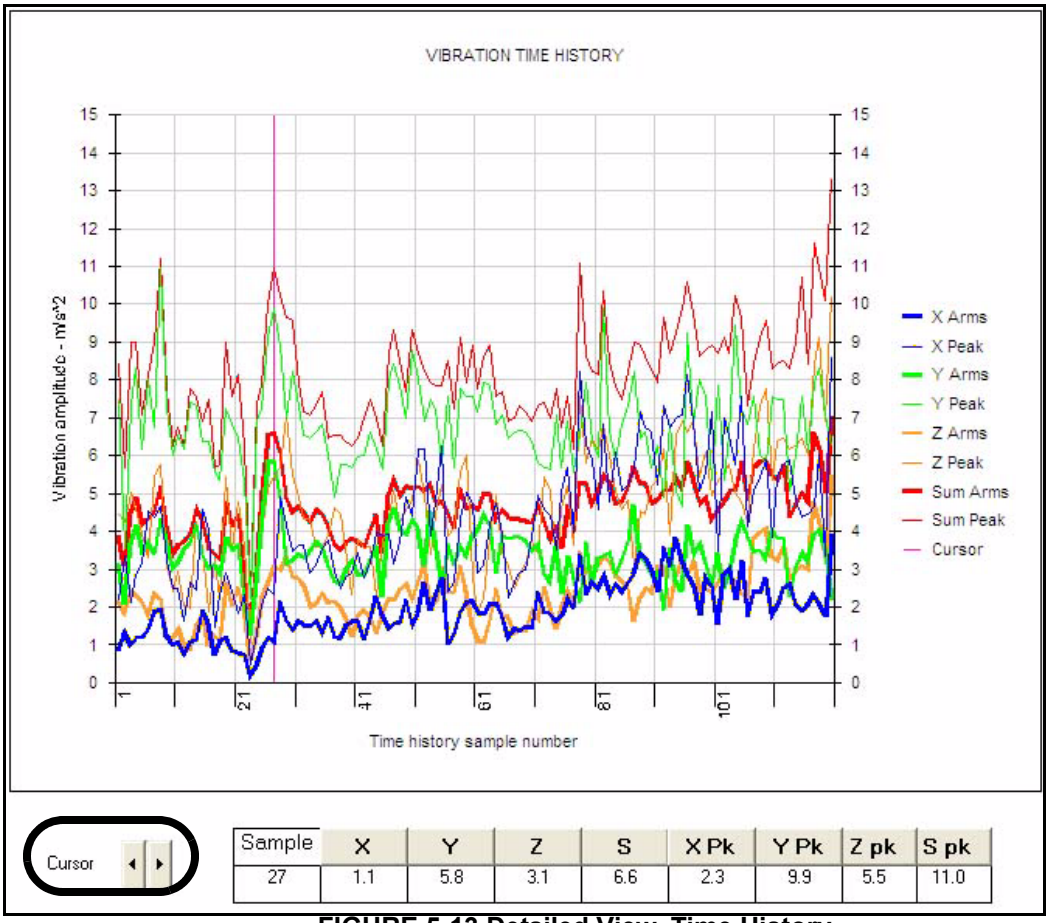


FIGURE 5-13 Detailed View, Time History

There are separate curves for RMS values (X, Y, Z and Sum) and Peak values (X, Y, Z and Sum).

Highlighting an Individual Trace

An individual trace can be highlighted, with all sample values clearly identified as shown in Figure 5-14, by left clicking on any sample value or left clicking on its line type in the legend on the right of the graph.

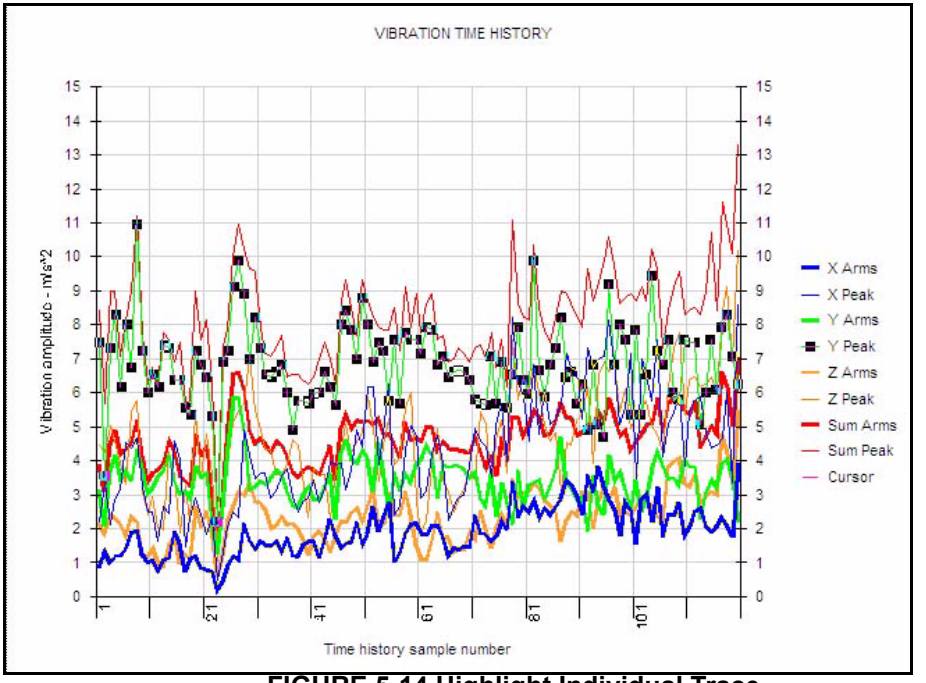


FIGURE 5-14 Highlight Individual Trace

Cursor and Digital Parameter Display

A cursor can be moved along the time axis using the left and right arrow keys to the lower left of the screen. Digital values of each of these parameters for the time corresponding to the cursor position are displayed at the bottom of the display.

Vertical Axis Scaling

To set the upper limit of the vertical axis, left click the "Set Ymax" box shown in FIGURE 5-15.

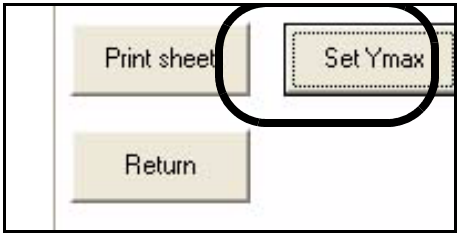


FIGURE 5-15 Set Vertical Axis Scale

This will open the window shown in FIGURE 5-16.

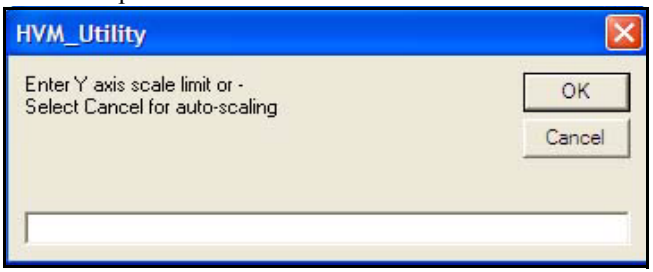


FIGURE 5-16 Selection of Vertical Axis Maximum

Enter a numerical value for the maximum of the vertical scale and press **OK**.

Pressing **Cancel** will cause the vertical axis to be auto scaled based on the values of the data being displayed.

Display of RMS Levels and VDV Values

Note that in the detailed view, the RMS levels and the VDV values for the displayed record appear in a table to the left of the graph, as shown in FIGURE 5-17.

	RMS Levels m/s^2	VDV m/s^1.75	
X	1.05	3.43	
Y	4.17	13.65	
Z	4.73	14.62	
Sum	6.38	18.84	Measurement Time h:m
CALC DATA*	**5.84**	**19.10**	**00:00**

* Data required in European calculation procedures

FIGURE 5-17 RMS Values, Detailed View

These are the same values which are displayed for the record selected for view in the standard display (see Figure 5-9 on page 5-8 for an example).

Print Detailed View

To print the detailed view, left click the “Print sheet” box as shown in FIGURE 5-18.

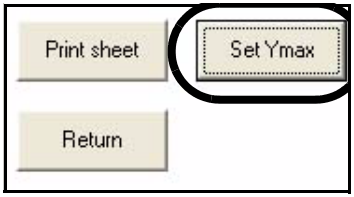


FIGURE 5-18 Print Detailed View

Return to Standard View

To return to the standard view, left click the “Return” box as shown in FIGURE 5-19.

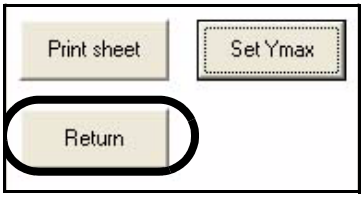


FIGURE 5-19 Return to Standard View

Document Database

Adding a Database Record

A Database Record can be added to the database to identify the tool whose vibration had been measured and the conditions under which the test was performed. From the standard display, left click the "Add database entry" box as shown in FIGURE 5-20.

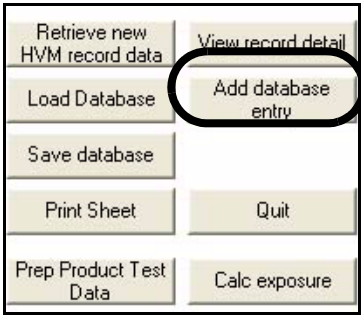


FIGURE 5-20 Add Database Record

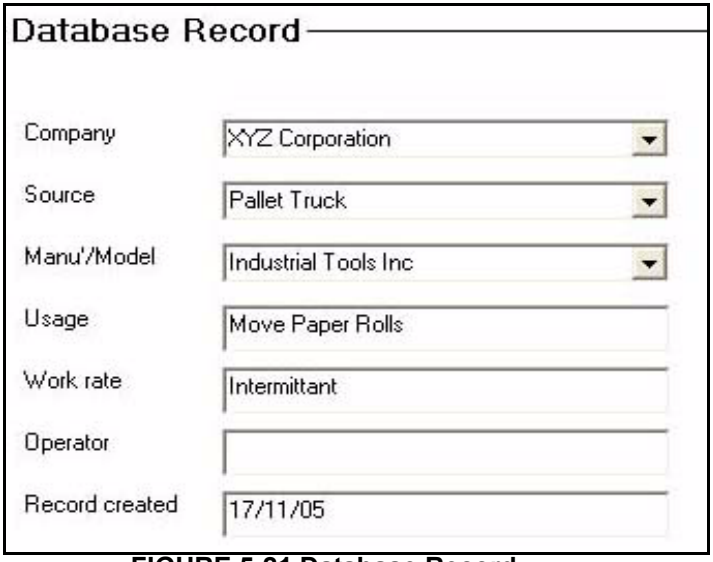


FIGURE 5-21 Database Record

The database plays a key role in the calculation of vibration exposure and also for the creation of test data sheets which will be described in detail in following chapters. As will be seen later in this manual, the user will be able to use the text entered into the Company, Source, and Manu/Model fields of the various database records to select items to be used for the calculation of daily exposure and the creation of Product Test Data Sheets.

Adding Record to Database

Left click the "Add to database" box to add the record created above to the database and return to the standard view.

Exit from Creation of Database

If you wish to exit from the creation of the database without adding the record, left click the "Resume" box which will open the window shown in FIGURE 5-22.

FIGURE 5-22 Warning: Data Not Added to Database

Left click the "Yes" box to return to the standard display without adding the record to the database.

Save Database

Left click the “Save database” box shown in to save the database.

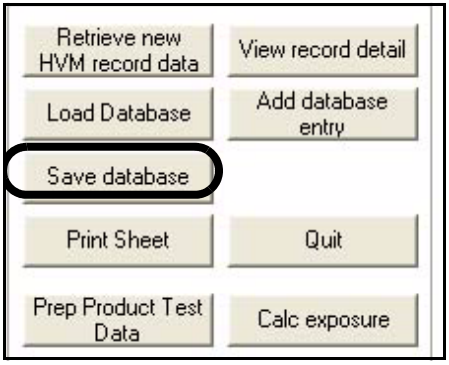


FIGURE 5-23 Save Database

Retrieve New HVM Record Data

To work with a different *.hvm record, rather than exiting from the program and beginning again, left click the “Retrieve new HVM record data” box as shown in FIGURE 5-24.

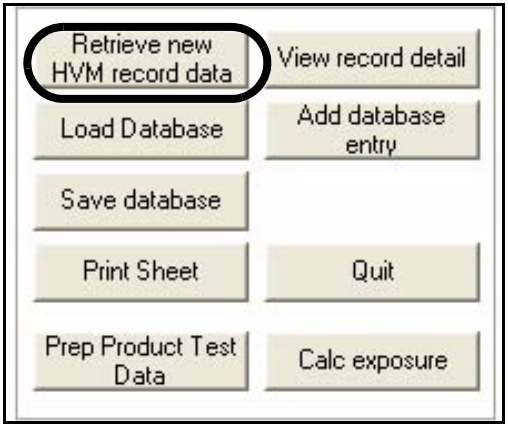


FIGURE 5-24 Retrieve New HVM Record

Load Database

When a database record has been created and saved, the user may wish to calculate daily exposure using this data record immediately, which would be done by left clicking the “Calc exposure” box. However, if it is desired to work with another existing database record instead, left clicking the “Load Database” box as shown FIGURE 5-25. will initiate this process.

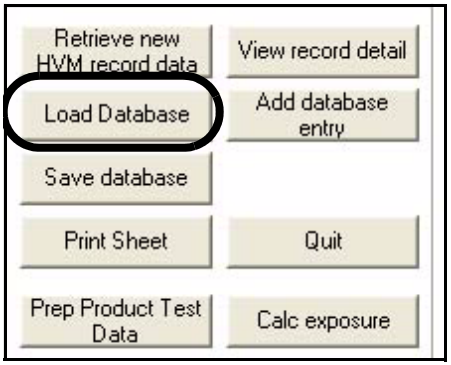


FIGURE 5-25 Load Database

Print Data Viewing Display

To print the Data Viewing Display shown in "Whole Body Data Record Viewing" on page 5-6, left click the “Print sheet” box shown in FIGURE 5-26.

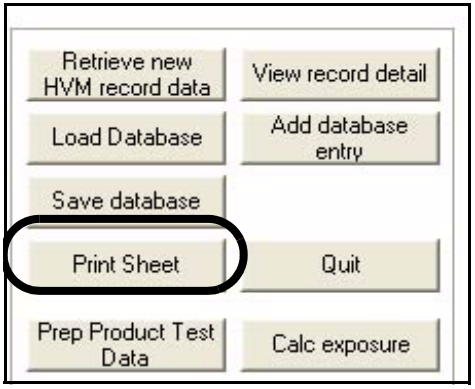


FIGURE 5-26 Print Data Viewing and Averaging Display

To access the module for the creation of the product test data sheet, left click the “Prep product test data” box as shown in FIGURE 5-27.

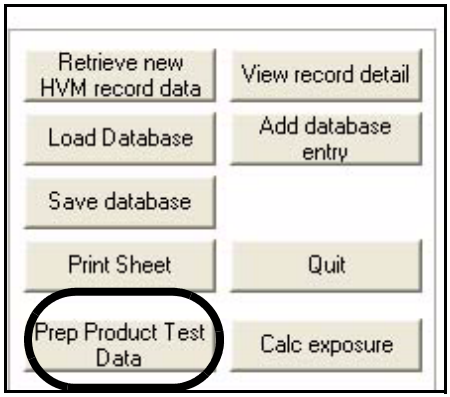


FIGURE 5-27 Access Prepare Product Test Data Module

The creation and use of the product test database is described in detail in Chapter 6 "Product Test Data Sheet" on page 6-1.

Daily Exposure Assessment

To assess the vibration exposure of a worker who may be exposed to different sources of whole body vibration, we utilize the databases which we have created which contain whole body vibration for various sources.

From the Whole Body Record Data Viewing display, the Daily Exposure Assessment page can be accessed by left clicking the “Calc exposure” box as shown in FIGURE 5-28.

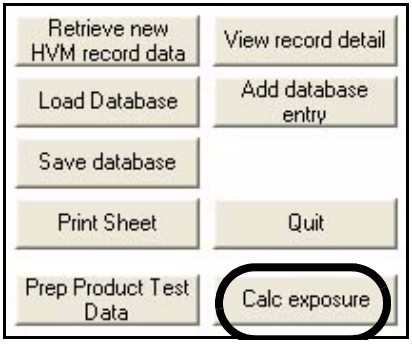


FIGURE 5-28 Access Daily Exposure Assessment Page

The will display the Daily Exposure Assessment Page shown in FIGURE 5-29.

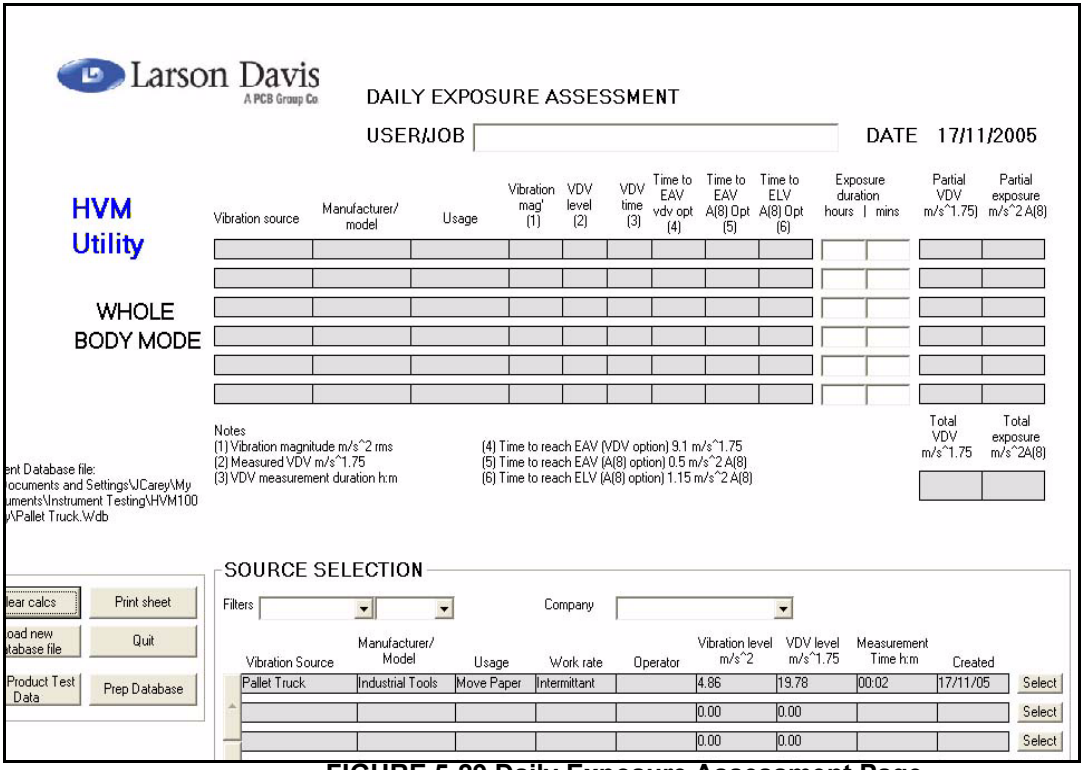


FIGURE 5-29 Daily Exposure Assessment Page

Single Source

We will begin by considering the simplest case where we are dealing with a single source of whole body vibration. The selection of the source utilizes the source selection table in lower portion of the Daily Exposer Assessment page shown in FIGURE 5-30.

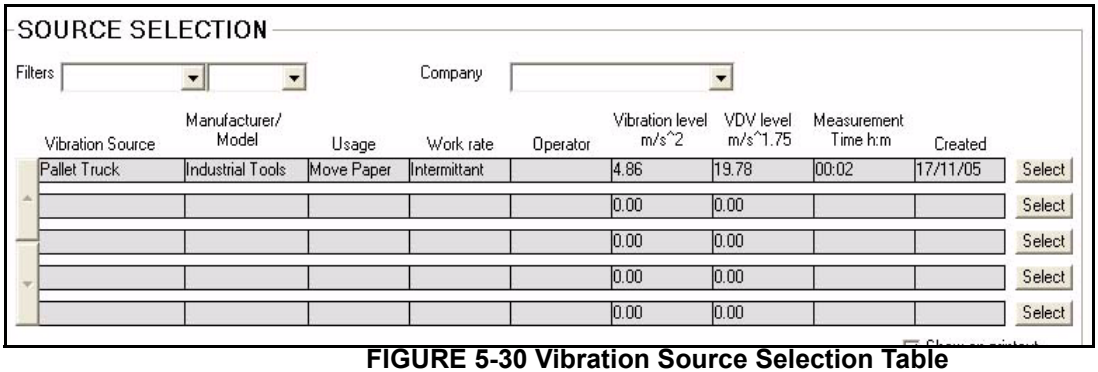


FIGURE 5-30 Vibration Source Selection Table

Database Record Information

In the first row of this table appear data from the database which was being used when this page was accessed, in this case data for Pallet Truck, made by Industrial Tools Inc, used to move paper rolls on an intermittent schedule.

The vibration exposure calculation utilizes the table in the upper portion of the Daily Exposure Assessment page, shown in FIGURE 5-31. Data for different sources of whole body vibration are transferred from rows in the Vibration Source Table to rows in the Vibration Exposure Calculation Table by left clicking on the “Select” box at the right end of the row in the Tools or Process Selection Table.

Since we have only a single row in the Vibration Source Table, it was only necessary to perform this operation once

to have the Vibration Exposure Calculation Table appear in the form shown in FIGURE 5-31.

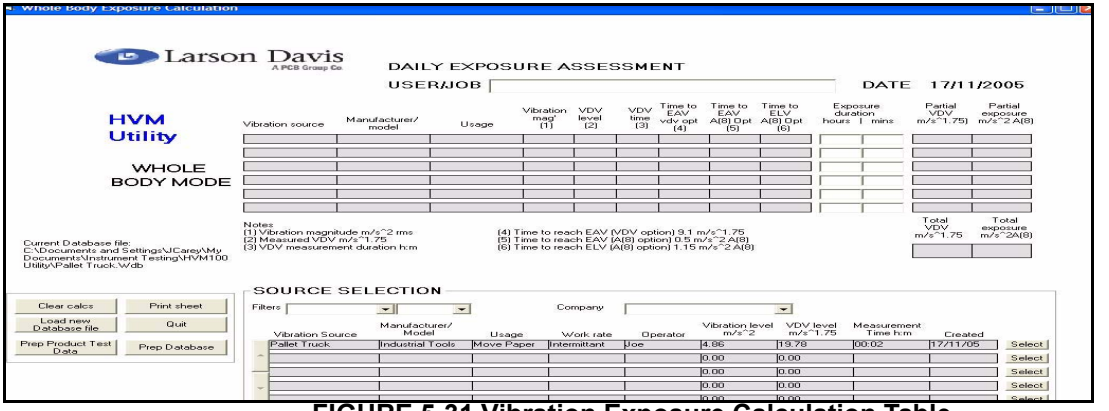


FIGURE 5-31 Vibration Exposure Calculation Table

Exposure Calculation

If it is expected that the worker will be using this device for three hours per day and has no other exposure to whole body vibration, it is only necessary to enter this value into the boxes for Exposure duration, as indicated in FIGURE 5-31. The exposure is then calculated and displayed as shown in FIGURE 5-32.

Vibration source	Manufacturer/ model	Usage	Vibration mag' (1)	VDV level (2)	VDV time (3)	Time to EAV vdv opt (4)	Time to EAV A(8) Opt (5)	Time to ELV A(8) Opt (6)	Exposure duration hours	mins	Partial VDV m/s^1.75)	Partial exposure m/s^2 A(8)
Pallet Truck	Industrial Tools	Move Paper Rolls	4.86	19.78	00:02	00:00	00:05	00:27	6	30	73.9	4.38

Notes
(1) Vibration magnitude m/s^2 rms
(2) Measured VDV m/s^1.75
(3) VDV measurement duration h:m
(4) Time to reach EAV (VDV option) 9.1 m/s^1.75
(5) Time to reach EAV (A(8) option) 0.5 m/s^2 A(8)
(6) Time to reach ELV (A(8) option) 1.15 m/s^2 A(8)

Total VDV m/s^1.75	Total exposure m/s^2A(8)
73.9	4.38

FIGURE 5-32 Vibration Exposure Example

This table can be annotated by entering text into the "User/ Job" data field, shown in Figure 5-33.

FIGURE 5-33 User/Job Annotation

Multiple Sources

As can be seen in the preceding section, the process for transferring data from the source selection table at the bottom into the exposure calculation table at the top is the same as for the hand/arm exposure calculation. For details on working with multiple sources of whole body vibration, see the description of the process used for hand/arm vibration presented in "Multiple Tools or Processes" on page 4-34.

Print Vibration Exposure Display

To print the Vibration Exposure Display, left click as shown in FIGURE 5-34.

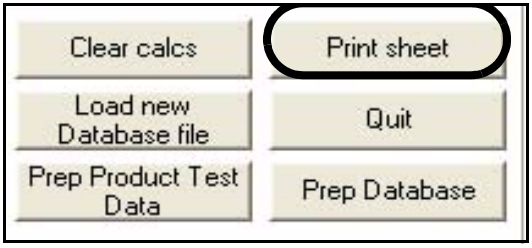


FIGURE 5-34 Print Vibration Exposure Display

Load New Database File

To load a new database file, left click on the “Load new Database file” box, as shown in FIGURE 5-35.

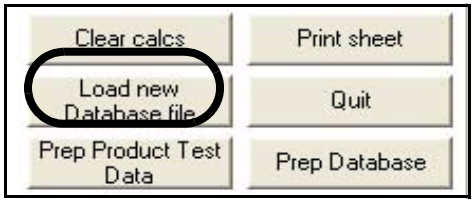


FIGURE 5-35 Load New Database File

Return to Data View Display]

To return to the Data View Display, left click on the “Prep Database” box as shown in FIGURE 5-36.

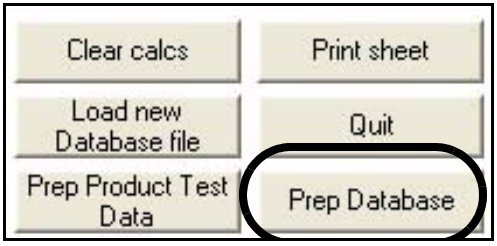


FIGURE 5-36 Return to Data View and Averaging Display

Product Test Data Sheet

To access the module for the creation of a product test data sheet, left click the “Prep Product Test Data” box as shown in FIGURE 5-37.

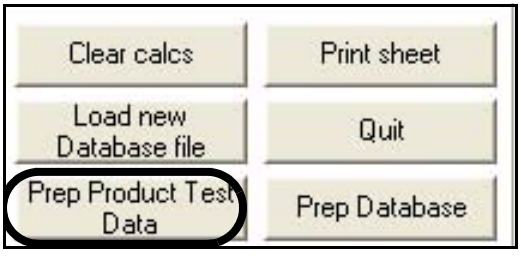


FIGURE 5-37 Access Product Test Data Module

The creation and use of the product test data sheet is described in detail in Chapter 6 "Product Test Data Sheet" on page 6-1.

Quit Whole Body Module

To quit the Whole Body module, left click the “Quit” box, as shown in FIGURE 5-38.

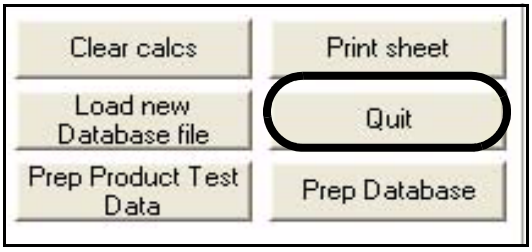


FIGURE 5-38 Quit Whole Body Module

This will return to the beginning of the program, with the Opening Screen displayed as shown in FIGURE 5-39.

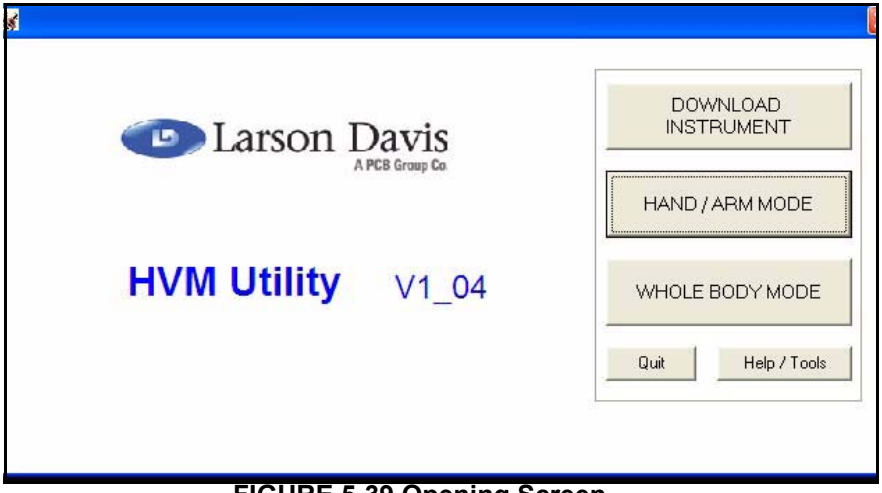


FIGURE 5-39 Opening Screen

CHAPTER

6 Product Test Data Sheet

Loading the Product Test Data Sheet Module

The product test data sheet module can be accessed from several points in the program.

Main Menus: Hand/Arm or Whole Body

When either of these main menus, shown in Figure 4-2 on page 4-2 and Figure 5-2 on page 5-2, respectively, are displayed, left click the “Prep Product Test Data Sheet” box on as shown in Figure 6-1.

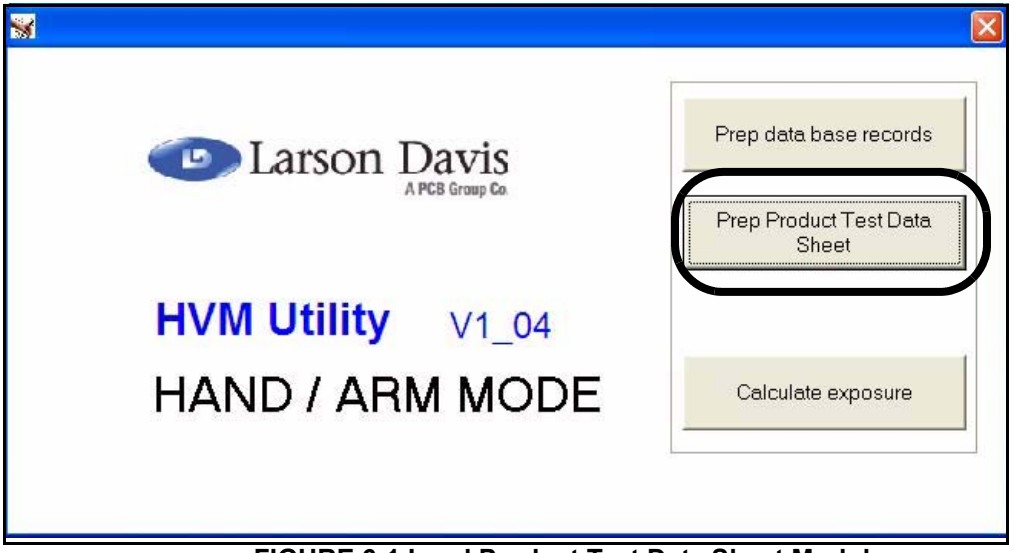


FIGURE 6-1 Load Product Test Data Sheet Module

Within Hand/Arm or Whole Body Modules

When working with either the Hand/Arm or the Whole Body modules, the Product Test Data Sheet can be accessed from either:

A. The Data View Display, by left clicking the "Prep Product Test Data" box as shown in Figure 6-2.

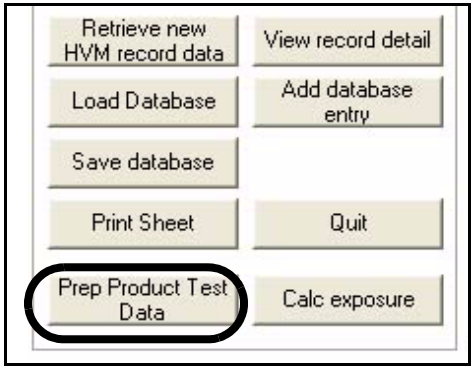


FIGURE 6-2 Load Product Test Data Sheet Module

B. The Exposure Assessment Page, by left clicking the "Prep Product Test Data" box as shown in Figure 6-3.

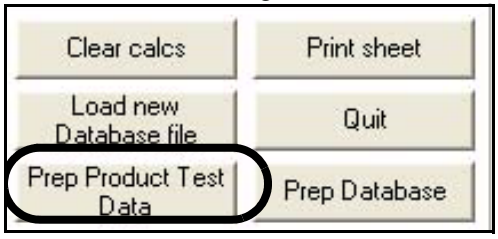


FIGURE 6-3 Load Product Test Data Sheet Module

Open a Database File

When loading the product test data sheet module from within the Hand/ Arm or Whole Body modules, a database file will have already been loaded, so this step is not necessary unless it is desired to work with a different database file.

When the product test data sheet module is loaded from the Hand/Arm or Whole Body main menus, the message shown in Figure 6-4 will appear to indicate that a database file must be opened in order to continue.

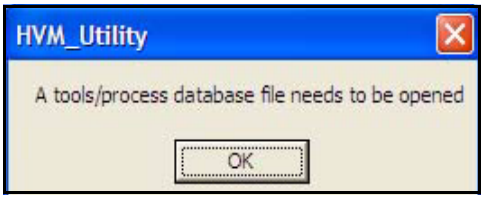


FIGURE 6-4 Database File Must Be Opened

Left clicking **OK** will display a menu for he selection of a database record, as shown in Figure 6-5.

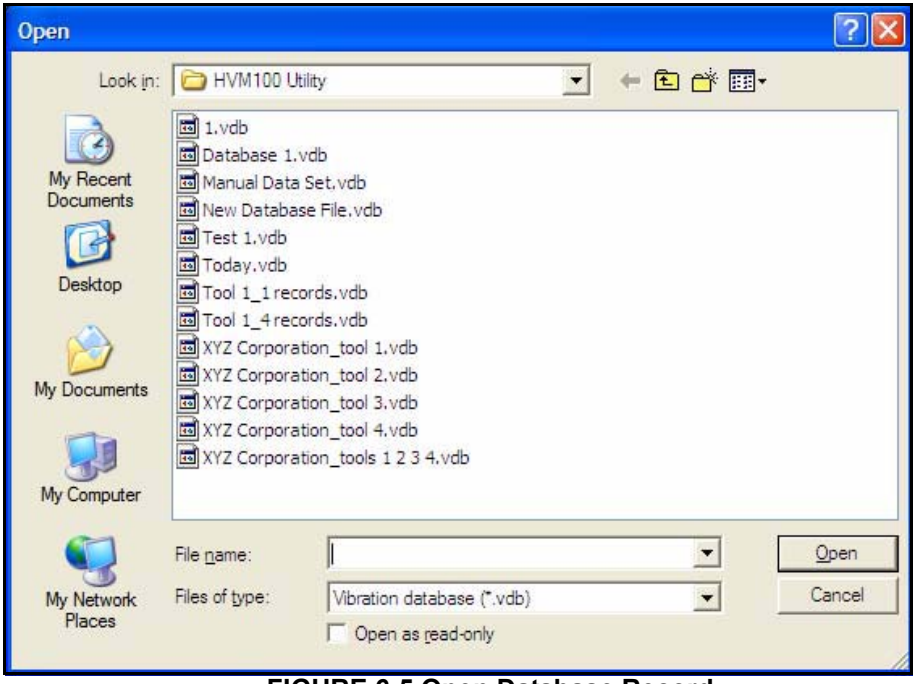


FIGURE 6-5 Open Database Record

For this example, we will open the database record entitled "XYZ Corporation_tools 1 2 3 4".

Highlight the desired database file and double left click, or left click **Open** to make the selection.

The resulting display will look like either Figure 6-6 on page 6-5 for Hand/Arm Vibration or Figure 6-15 on page 6-11 for Whole Body Vibration

Although the data presented are different for the two types of product test data sheets, the procedures for utilizing them are the same. These are described in detail in the following section “Hand/Arm Vibration”.

Hand/Arm Vibration

Using this module, unique product test data sheets are created by selecting different tools from one or more previously developed databases.

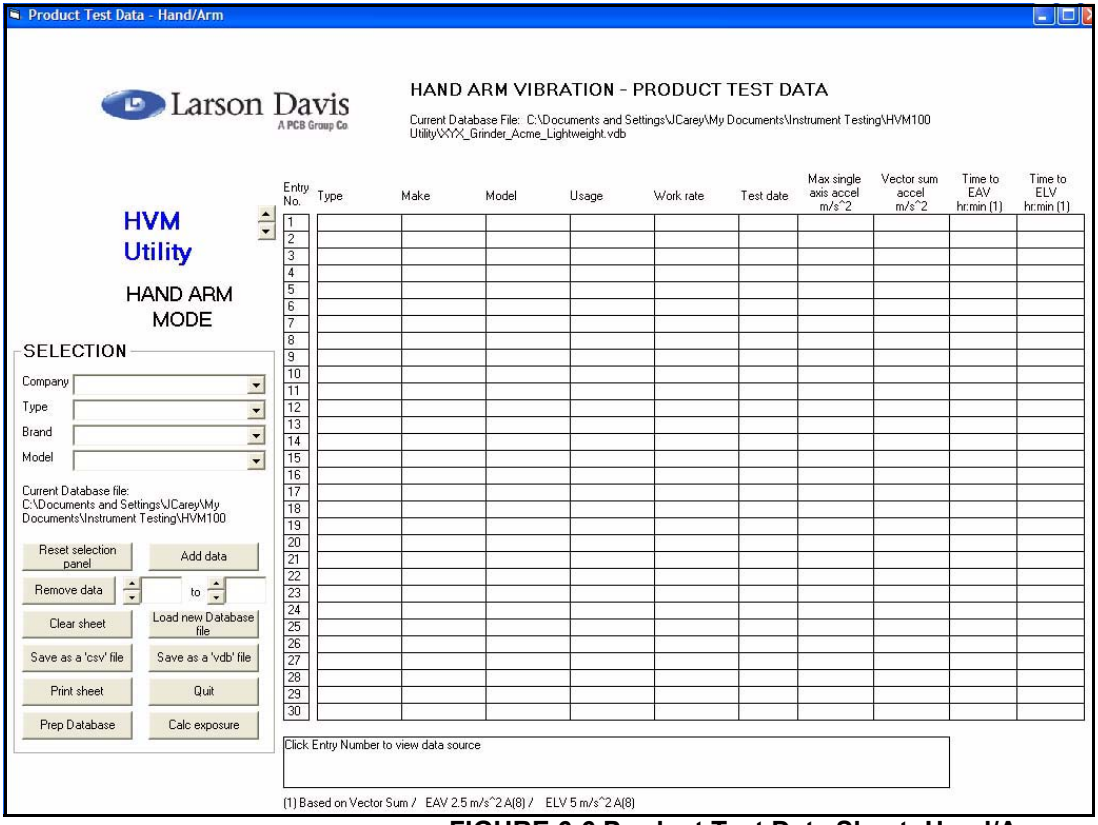


FIGURE 6-6 Product Test Data Sheet: Hand/Arm Vibration

The procedure for developing these sheets will be described using several examples. The controls which will be used for the selection of tools are located to the left of the data sheet, as shown in Figure 6-7.

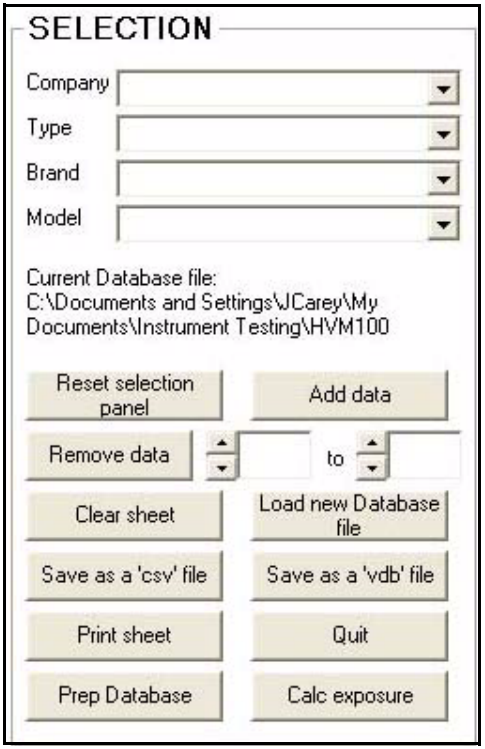


FIGURE 6-7 Selection of Tools

When creating each database, the user enters text into the Company, Type, Brand and Model fields, which are saved with the database. When creating a product test data sheet, these fields are used to search for the tools to be added to the database.

Suppose we have four separate databases whose search parameters are as follows:

Database Name	Company	Type	Brand	Model
ABC Company_Grinder_Acme_Lightweight	ABC Company	Grinder	Acme	Lightweight
ABC Company_Grinder_Acme_Heavyweight	ABC Company	Grinder	Acme	Heavyweight
ABC Company_Grinder_White Tool_Lightweight	ABC Company	Grinder	White Tool	Lightweight
ABC Company_Grinder_White Tool_Heavyweight	ABC Company	Grinder	White Tool	Heavyweight

Table 6-1 Four Single Tool Databases

And suppose that we had selected the first database, ABC Company_Grinder_Acme_Lightweight, when we opened the product test data sheet module, as described in "Open a Database File" on page 6-3.

For each of the search parameter fields, when we left click the down arrow to the right of the field, only a single parameter will appear corresponding with the parameters shown in the first row of Table 6-1 "Four Single Tool Databases".

So, to begin, make a selection for each of the fields by left clicking and selecting the only parameter that appears. The field will then look as shown in Figure 6-8.

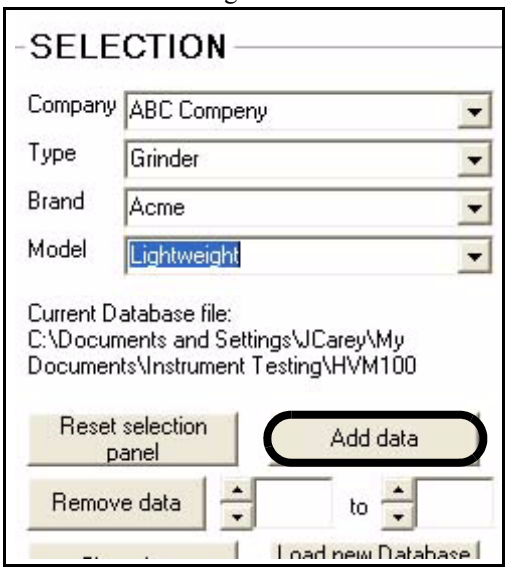


FIGURE 6-8 Parameter Selection, Four Databases

Left click the "Add data" box, shown in Figure 6-8, to add his tool to the database, which will now appear as shown in Figure 6-15.

Entry No.	Type	Make	Model	Usage	Work rate	Test date	Max single axis accel m/s^2	Vector sum accel m/s^2	Time to EAV hr:min (1)	Time to ELV hr:min (1)
1	Grinder	Acme	Lightweight			15/11/05	1.45	2.00	12:30	50:00
2										
3										
4										

FIGURE 6-9 Product Test Data, Tool 1

Left click the "Reset selection panel" box shown in Figure 6-9 to clear the data fields for the next selection.

Left click the "Load new database" box, shown in Figure 6-10.

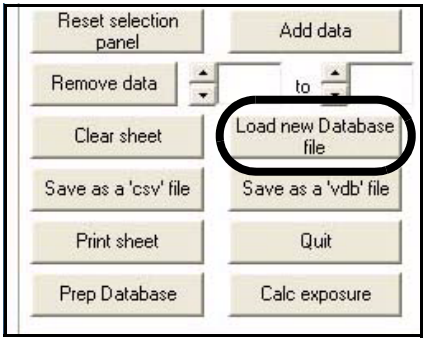


FIGURE 6-10 Load New Database File

When the window opens to make a selection, select the next database in the second row of Table 6-1, “Four Single Tool Databases,” on page 6-7.

Repeat the same procedure to load the tools from all four databases to obtain the product test data sheet shown in Figure 6-15.

Entry No.	Type	Make	Model	Usage	Work rate	Test date	Max single axis accel m/s^2	Vector sum accel m/s^2	Time to EAV hr:min (1)	Time to ELV hr:min (1)
1	Grinder	Acme	Lightweight			15/11/05	1.45	2.00	12:30	50:00
2	Grinder	Acme	Heavyweight			15/11/05	1.45	2.00	12:30	50:00
3	Grinder	White Tool	Lightweight			15/11/05	3.89	4.79	2:10	8:43
4	Grinder	White Tool	Heavyweight			15/11/05	3.89	4.79	2:10	8:43
5										

FIGURE 6-11 Product Test Data, Four Tools

Multiple Tool or Process Database

The creation of a multiple tool database is described in "Multiple Tools or Processes" on page 4-34.

In this example, we will assume that when we opened the product test data sheet module we loaded a single database which contains all four tools with the parameters shown in Table 6-1, “Four Single Tool Databases,” on page 6-7.

We will see that we still have only one choice for Company and Type, as shown in Figure 6-12.

FIGURE 6-12 Selection of Company and Type

However, we now have two choices for Brand and Model, as shown in Figure 6-13 and Figure 6-14, respectively.

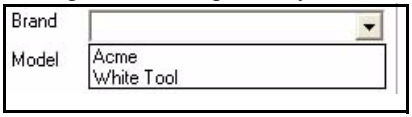


FIGURE 6-13 Selection of Brand

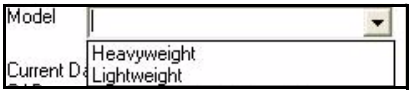


FIGURE 6-14 Selection of Model

Thus, when we have a database with multiple tools using similar parameters for Company, Type, Brand and Model, we can create a product test data sheet without having to load multiple databases.

Whole Body Vibration

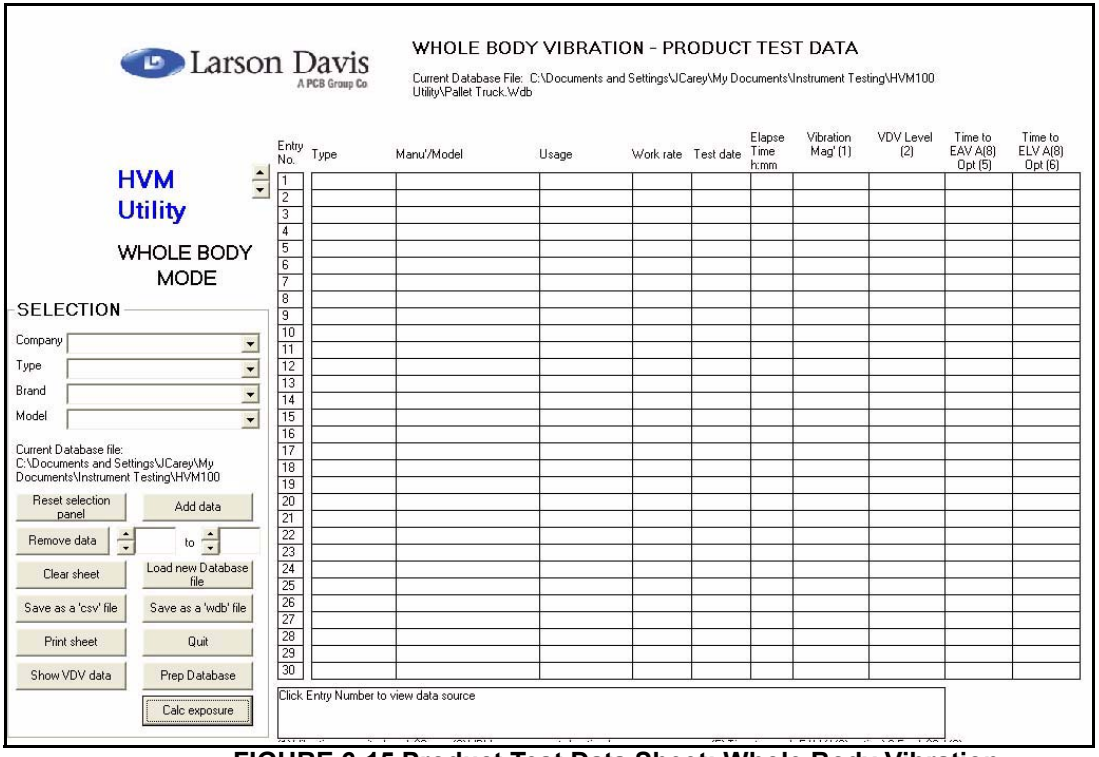


FIGURE 6-15 Product Test Data Sheet: Whole Body Vibration

Except for the data presented, the product test data sheet for whole body vibration is the same as the product test data sheet for hand/arm vibration. An expanded view of the data presented in the whole body version of the product test data sheet is shown in Figure 6-16.

Entry No.	Type	Manu'/Model	Usage	Work rate	Test date	Elapse Time h:mm	Vibration Mag' (1)	VDV Level (2)	Time to EAV A(8) Opt (5)	Time to ELV A(8) Opt (6)
1	Pallet Truck	Medium Duty	Regular	Light	14/11/05	00:00	5.84	19.11	00:04	00:19
2										
3										

FIGURE 6-16 Whole Body Vibration Data

CHAPTER

7 Help/Tools

Opening Help/Tools

The Help/Tools module is opened from the Opening Screen, shown in Figure 2-7 on page 2-5 and repeated below in FIGURE 7-1.

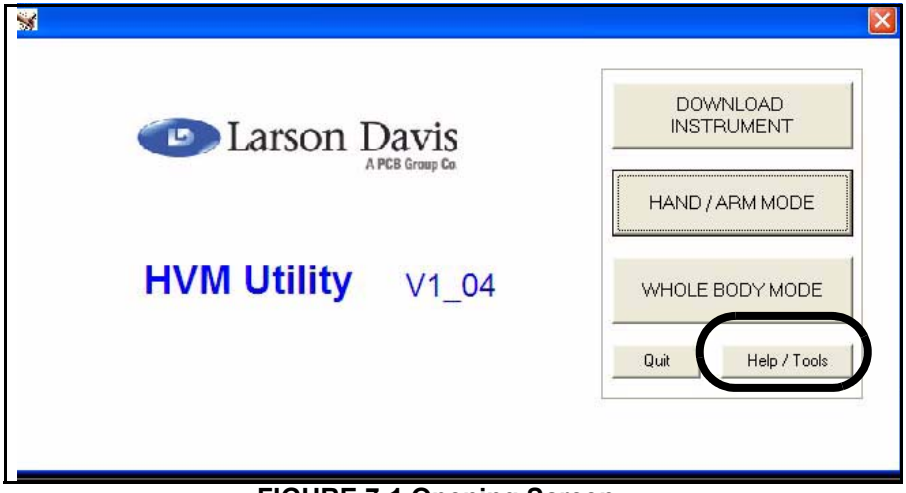


FIGURE 7-1 Opening Screen

To open the module, left click the “Help/Tools” box as shown in FIGURE 7-1.

This will open the Help/Tools Main Menu, shown in FIGURE 7-2.

FIGURE 7-2 Help/Tools Main Menu

This menu provides access to eight text screens corresponding to each of the eight subjects listed. To display a text screen, left click on the subject line. These text screens will appear as follows:

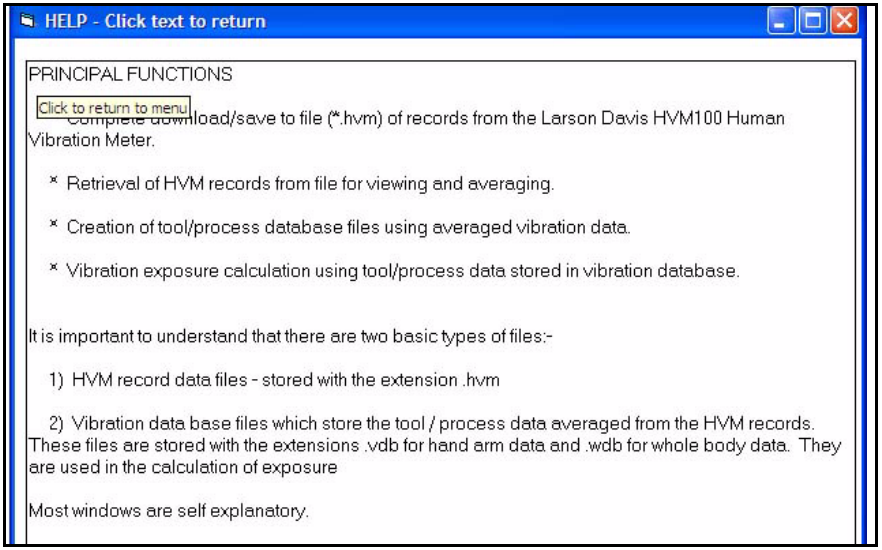


FIGURE 7-3 Overview Help

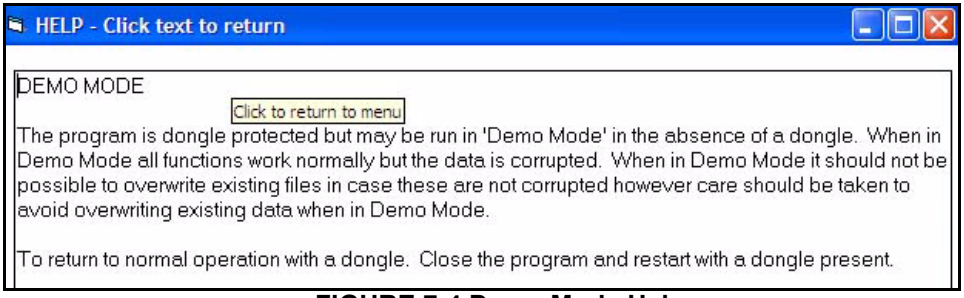


FIGURE 7-4 Demo Mode Help

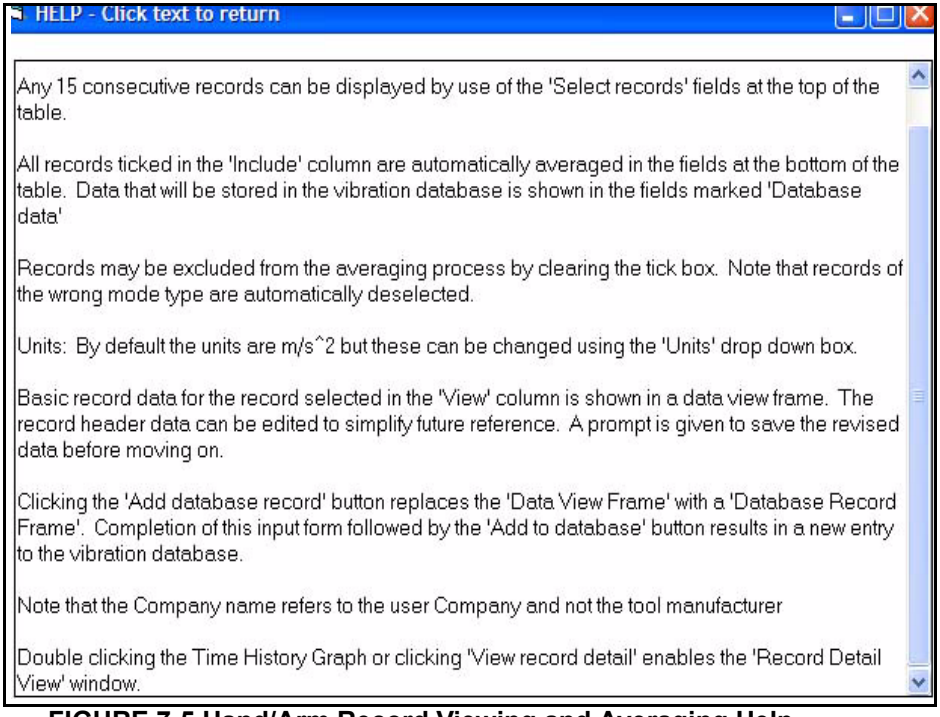


FIGURE 7-5 Hand/Arm Record Viewing and Averaging Help

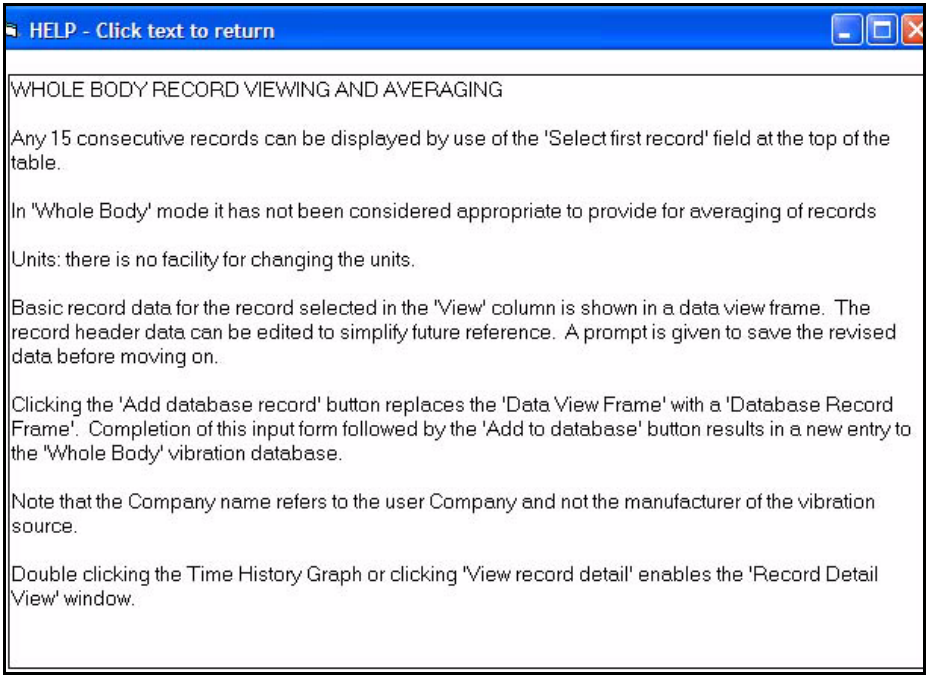


FIGURE 7-6 Whole Body Record Viewing Help

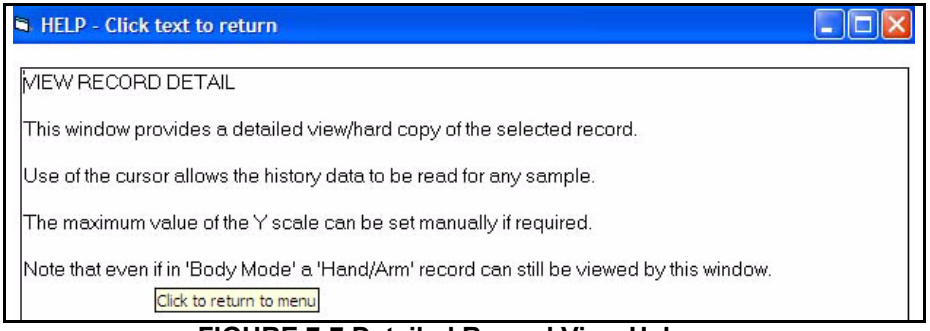


FIGURE 7-7 Detailed Record View Help

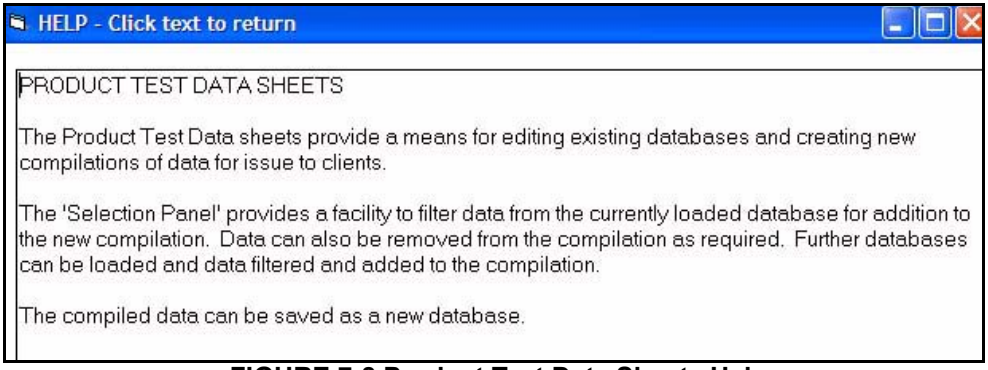


FIGURE 7-8 Product Test Data Sheets Help

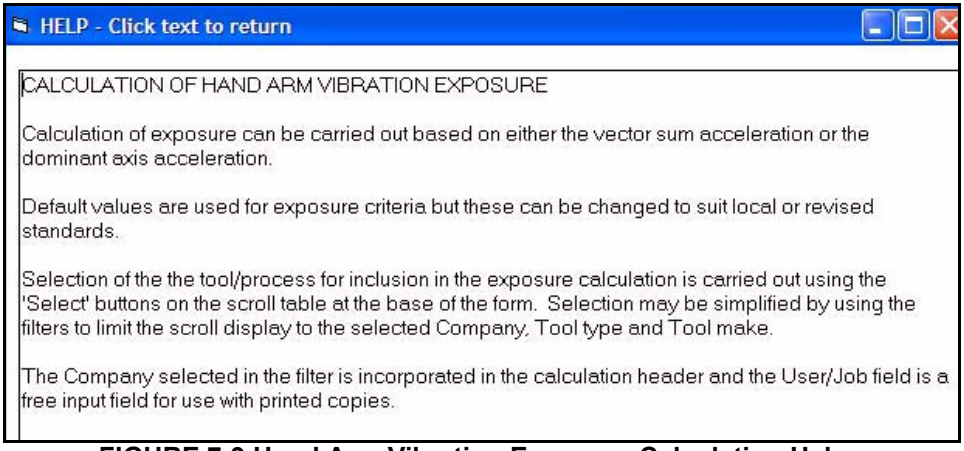


FIGURE 7-9 Hand Arm Vibration Exposure Calculation Help

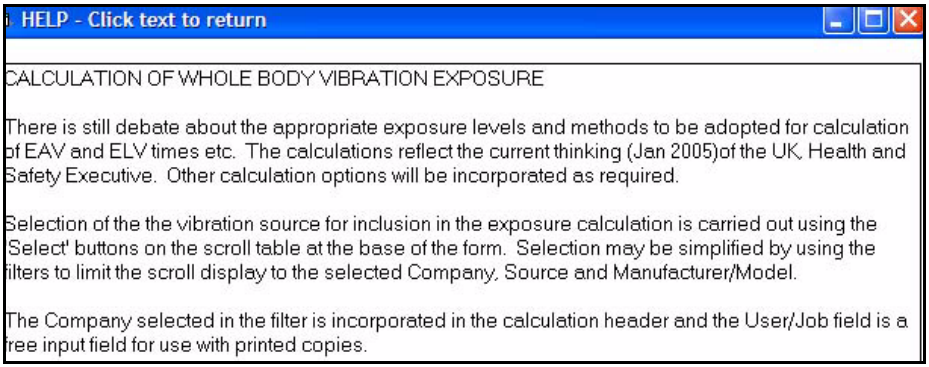


FIGURE 7-10 Whole Body Exposure Calculation Help

Adding a Custom Logo

You can replace the Larson Davis logo on the reports with one of your own (jpg, wmf and bmp formats). To do this, left click the "Add custom logo" as shown in Figure 7-11.

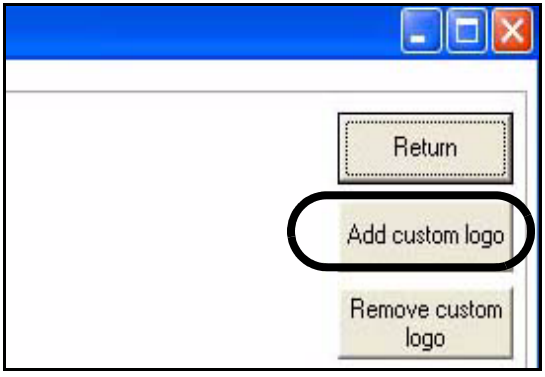


FIGURE 7-11 Add Custom Logo Box

This will open a menu permitting you to define the path and the name of the logo file. When the software is restarted, the new logo will be added to all reports generated by the software and within the software menus as well.

Deleting a Custom Logo

To delete the custom logo, simply left click the “Remove custom logo” box shown below the “Add custom logo” box in Figure 7-11.

APPENDIX

A Warranty/Customer Satisfaction

A. Total Customer Satisfaction. Larson Davis, Inc. (“LD”) guarantees Total Customer Satisfaction. If, at any time you are not completely satisfied with any LD product, LD will repair, replace or exchange it at no charge, except as otherwise provided in this Limited Warranty. The employees of LD strive to provide superior, unmatched customer service. Should you find yourself dissatisfied with any LD product for any reason, consult a LD Application engineer or local representative/ distributor to discuss your situation.

B. Purchase Price Refund/Limited Warranty. LD warrants to the original purchaser (the "Buyer") that, unless otherwise expressly specified in writing by a LD officer, all LD products shall be free of defects in material and workmanship for a period of two (2) years from date of original purchase. In furtherance of LD's commitment to Total Customer Satisfaction, LD will, for a period of one (1) year from date of original purchase, refund 100% of the customer's purchase price for any LD product with which the buyer is not completely satisfied, subject to the exceptions contained in Paragraph J of this Limited Warranty. The option of a refund may be selected during this one (1) year period in lieu of repair, replacement or exchange of the product.

Extended Labor Warranty. In furtherance of LD's commitment to Total Customer Satisfaction, LD offers an extended labor warranty of one (1) year on all products calibrated or certified by a factory technician at any time or from time-to-time during the first seven years of the product life from date of manufacture. The customer's sole remedy pursuant to this extended warranty is to receive free labor for any repairs required during the period in which the extended warranty is effective. This extended labor warranty is subject to the limitations as outlined in Paragraph J.

Service & Repair Limited Warranty. In addition to the limited warranties set forth above, LD offers a 90-day parts and labor limited warranty for all repair work performed at the factory. This warranty is limited to parts repaired or replaced at the factory by LD. This warranty is also subject to the limitations as outlined in Paragraph J.

C. Shipping Charges. The buyer will return the product freight prepaid by the Buyer to an authorized service center. The product will be returned to the buyer freight prepaid by LD.

D. Products Manufactured by Others. This Limited Warranty does not cover any products manufactured by others. Such products are subject to the warranty, if any, of their respective manufacturers, and to be repaired only by a respective authorized service person for such products. LD shall have no obligation to undertake repairs of products manufactured by others.

E. NO SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES. LD'S SOLE OBLIGATIONS UNDER THIS LIMITED WARRANTY ARE SET FORTH ABOVE IN PARAGRAPHS A, B, C AND D. IN NO EVENT SHALL LD (ITS CONTRACTORS OR SUPPLIERS) BE LIABLE TO THE BUYER FOR ANY LOST PROFITS, DIRECT, INDIRECT, SPECIAL, INCIDENTAL OR CONSEQUENTIAL DAMAGES, WHETHER BASED ON CONTRACT, IN TORT OR ANY OTHER LEGAL THEORY. SUCH DAMAGES FOR WHICH LD SHALL NOT BE RESPONSIBLE INCLUDE, BUT ARE NOT LIMITED TO, LOST TIME AND CONVENIENCE, LOSS OF USE OF THE PRODUCT, THE COST OF A PRODUCT RENTAL, COSTS OF GASOLINE, TELEPHONE, TRAVEL OR LODGING, THE LOSS OF PERSONAL OR COMMERCIAL PROPERTY, AND THE LOSS OF REVENUE.

Some states do not permit the limitation or disclaimer of incidental or consequential damages. Therefore, the above disclaimer of incidental or consequential damages may not apply to certain purchasers.

F. NO LIABILITY IN EXCESS OF PURCHASE PRICE. IN NO EVENT SHALL LD'S OBLIGATIONS UNDER THIS LIMITED WARRANTY EXCEED THE PURCHASE PRICE OF THE PRODUCT PLUS ANY SHIPPING CHARGES THAT LD MAY BE OBLIGATED TO PAY PURSUANT TO PARAGRAPH C ABOVE.

G. NO EXTENSION OF STATUTE OF LIMITATIONS. ANY REPAIRS PERFORMED UNDER THIS LIMITED WARRANTY SHALL NOT IN ANY WAY EXTEND THE STATUTES OF LIMITATIONS FOR CLAIMS UNDER THIS LIMITED WARRANTY.

H. WAIVER OF OTHER WARRANTIES. THE EXPRESS WARRANTIES SET FORTH IN THIS LIMITED WARRANTY ARE IN LIEU OF AND EXCLUDE ANY AND ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, INCLUDING BUT NOT LIMITED TO, THE IMPLIED WARRANTIES OF MERCHANTABILITY AND FITNESS FOR A PARTICULAR PURPOSE.

Some states do not permit the disclaimer of implied warranties. Therefore, the above disclaimer of implied warranties may not apply to certain purchasers.

I. Procedure for Warranty Performance. If the product fails to perform to LD's specifications, the Buyer must provide LD with the applicable model and serial numbers, the date of purchase, and the nature of the problem.

J. ADDITIONAL EXCLUSIONS FROM THIS LIMITED WARRANTY. NOTWITHSTANDING ANYTHING TO THE CONTRARY CONTAINED IN THIS LIMITED WARRANTY, THIS LIMITED WARRANTY DOES NOT COVER ANY OF THE FOLLOWING:

1.EQUIPMENT THAT HAS BEEN ABUSED, DAMAGED, USED BEYOND RATED CAPACITY, OR REPAIRED BY PERSONS OTHER THAN AUTHORIZED SERVICE PERSONNEL.

2.DAMAGE CAUSED BY ACTS OF GOD THAT INCLUDE, BUT ARE NOT LIMITED TO, HAILSTORMS, WINDSTORMS, HURRICANES, TORNADOES, SANDSTORMS, LIGHTNING, FLOODS AND EARTHQUAKES.

3.DAMAGE UNDER CONDITIONS CAUSED BY FIRE OR ACCIDENT, BY ABUSE OR BY NEGLIGENCE OF THE USER OR ANY OTHER PERSON OTHER THAN LD, BY IMPROPER INSTALLATION, BY MISUSE, BY INCORRECT OPERATION, BY "NORMAL WEAR AND TEAR", BY IMPROPER ADJUSTMENT OR ALTERATION, BY ALTERATIONS NOT COMPLETED BY AUTHORIZED SERVICE PERSONNEL, OR BY FAILURE OF PRODUCTS PARTS FROM SUCH ALTERATIONS.

4.COSTS OF REPAIRING DAMAGE CAUSED BY POOR OR IMPROPER MAINTENANCE OR UNAUTHORIZED REPAIR.

5.COSTS OF MODIFYING THE PRODUCT IN ANY WAY ONCE DELIVERED TO THE BUYER, EVEN IF SUCH MODIFICATIONS WERE ADDED AS A PRODUCTION CHANGE ON OTHER PRODUCTS MADE AFTER THE BUYER'S PRODUCT WAS BUILT.

Authority to Alter This Limited Warranty. No agent, representative, distributor, or authorized dealer of LD has any authority to alter the terms of this Limited Warranty in any way. This Limited Warranty may be altered only in a writing signed by an authorized officer of LD.

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